JANUARY 29, 1996 VOLUME 13, NUMBER 5

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Taking IBM's ATM pulse

The market is soft and the competition fierce, but Big Blue isn't giving up its ATM gig yet.
Page 57.

Frame prices shaken

AT&T rates go up as LDDS revamps its pricing model.

By Joanie Wexler and David Rohde

The Federal Communications Commission's months-old mandate calling for carriers to tariff frame relay services has yielded its first fruit: rate hikes from AT&T and a pricing revamp from LDDS WorldCom.

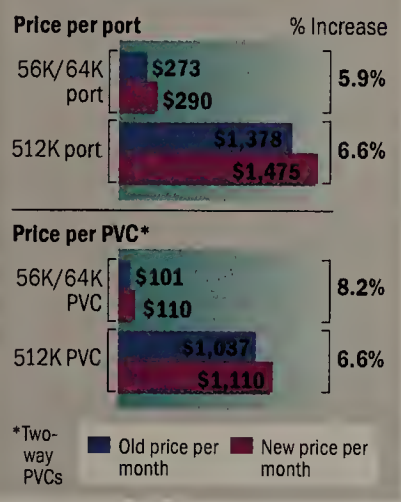
AT&T last week filed for a 6% average price increase for its InterSpan frame relay services, while LDDS WorldCom's planned Feb. 5 filing will lower basic rates but curb discount opportunities and virtually do away with the company's unique nonlinear pricing model (see story, page 95).

MCI Communications Corp. said it would file its tariffs by the FCC's Feb. 5 deadline, but would not change prices. It will, however, add service guarantees for net availability, average time

See **Frame prices,** *page 95*

GETTING A RISE OUT OF AT&T

AT&T says tariffing frame relay means higher prices because it must serve all users nondiscriminately.



Cisco SNA product line hits IBM where it hurts

SNA barrage to put routers at epicenter of enterprise.

By Michael Cooney and Jim Duffy
Raleigh, N.C.

Cisco Systems, Inc. is preparing a wide-ranging product assault on the IBM SNA world that it hopes will propel the firm ahead in the battle for corporate backbones.

The products, the first of which could come later this quarter, will help users build more scalable router-based SNA internetworks. They are expected to include:

- Software for Cisco's Channel Interface Processor (CIP).
- New routing software that includes support for IBM's High Performance Routing (HPR) technology.
- A release of the Native Client Interface Architecture (NCIA) software.
- A new workgroup token-ring switch, possibly incorporating the same technology that is in IBM's 8272 Token-Ring Switch.

The company also is expected to deliver CiscoWorks Blue network management applications to help users more effectively manage the SNA environment.

While not providing additional detail, Cisco confirmed SNA improvements would be forthcoming.

See **Cisco,** *page 95*

CISCO'S BIG BLUE ASSAULT

The company's SNA strategy aims to:

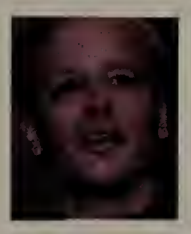
- Make SNA internetworks more scalable.
- Employ high-speed routing techniques in SNA/APPN nets.
- Integrate and simplify SNA internetwork management.
- Give Cisco a foothold in the token-ring workgroup switching market.

Lotus Notes lovefest packs 'em in

By Carol Sliwa
Orlando

Early Sunday morning, Jan. 21, the faithful packed the hall from wall to wall.

Religion would come not from the pages of the Bible, the Torah or the Talmud that morning but from the four-volume set of proceedings for Lotus Development's Corp.'s customer conference at Walt Disney World, where Notes Release 4 made its long-awaited debut.



Ray Ozzie, *the father of Lotus Notes, discusses the application's future. Page 8.*

Whether user or analyst, opinions fused on one point: There's no other product like Notes on the market right now.

The latest version, unleashed by dervishes whirling around a huge yellow box to loud, pulsating music, includes: a more user-friendly interface borrowed from Lotus' popular cc:Mail product; sophisticated replication capabilities for remote users; enhanced application development tools via the LotusScript 3.0 object-oriented programming language; direct access to the Internet via the InterNotes Web Navigator; and greater scalability potential.

For those who predicted last fall that Notes would lose out to the Web, Lotus CEO Mike Zisman had this message: "The notion that Notes is dead is dead."

As for the other competition?

"If there was competition, I feel [Notes Release 4] would blow it away," said Bill Quintrell, a Notes user and director of technology integration for Chatta-

See **Lotus,** *page 8*

Lotusphere

Lotus serves up a heaping helping of news about cc:Mail, mini-applications and Notes futures. Page 8.

Microsoft tackles IBM MQ

By John Cox
Redmond, Wash.

Microsoft Corp. is designing a messaging product aimed at guaranteeing reliable communications between applications over WANs.

An internal document, inadvertently put on Microsoft's public World-WideWeb site, describes Microsoft Message Queuing (MQ) as designed to create a store-and-forward, or asynchronous, connection among applications in heterogeneous networks.

> *"MQ provides the basic messaging mechanism essential for distributed computing. Distributed object services, distributed event services and transaction services will use MQ services."*
>
> **Excerpt from Microsoft white paper on message queuing**

In theory, the software will take over from developers nearly

See **Microsoft,** *page 96*

Net control start-up gets SMARTS

By Jim Duffy
White Plains, N.Y.

Academia and the private sector have joined to develop a powerful event correlation technology to ease management of corporate networks and the administration of Internet access.

System Management ARTS, Inc. (SMARTS), a start-up spun off from Columbia University's

See **SMARTS,** *page 96*

Grab a paper on the technology behind SMARTS products. Select News+ then Front Page.

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COMNET PRODUCT BLITZ

COMNET

- 3Com to make its Cellplex ATM switches more enticing via Ethernet and fast Ethernet links. Page 10.
- Stratacom to downsize its IGX ATM backbone switch. Page 16.
- General Datacomm pairs with Equinox on remote access. Page 16.
- Start-up Nuera targets voice over frame relay. Page 16.
- EMI tunes up its frame relay service to better handle voice and SNA traffic. Page 21.

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News briefs, January 29, 1996

What a Man-zi

Former Lotus Chairman *Jim Manzi*

■ Former Lotus Development Corp. Chairman Jim Manzi has cast his lot with the Web. The former Notes evangelist is now president and chief executive officer of Pittsburgh-based Industry.net, a Web service firm that is developing a system to handle transactions. Manzi pal and Notes architect Ray Ozzie. however, will stay put.

Web of Hate still tangled

■ The controversy over Web hate sites continues to swirl. Last week, the German government, which has laws against hate speech and neo-Nazism, revealed an investigation of Deutsche Telekom over access to hate sites. At the center of the dispute is Ernst Zundel (*NW,* Jan. 8, page 8), a Toronto-based Holocaust revisionist. As reported in *Network World*, Zundel set up his "Zundelsite" in the U.S. to avoid the stricter speech laws of Germany and Canada. DT has banned German access to the Zundelsite.

Microsoft revises OS licenses, SMS

■ Microsoft Corp. last week announced a volume licensing plan that would let customers install Windows 95 or NT Workstation for the same price. The $229-per-PC plan is designed for users that intend to migrate to NT. Separately, Microsoft announced a new version of Systems Management Server that converts NT events to Simple Network Management Protocol traps and can remotely control an NT machine.

ComNet collection

■ At this week's ComNet '96, Cisco Systems, Inc. is expected to roll out a new remote access server and enhancements to existing ones. The server could be the long-awaited Ascend Communications, Inc. "MAX-killer."

Separately, IBM will include among its campus Asynchronous Transfer Mode announcements this week, a $295 25M bit/sec ATM adapter for ISA- and PCI-based workstations. The company also will introduce an ATM Launch Kit that includes an integrated 8260 hub, the 8282 ATM Concentrator, 8281 LAN Bridge, PC500 server and NetWare software. The kit is priced at $64,795.

Also at the show, ISICAD, Inc. will unveil Version 2.2 of its Command configuration management system. Command 2.2 will feature automated network design, change management, and customization of LANs and WANs. It also will support Informix Software, Inc. and Ingres databases, and run on Cabletron Systems, Inc.'s Spectrum 3.1, SunSoft, Inc.'s SunNet Manager 2.2.2 and Hewlett-Packard Co.'s OpenView 4.0 management platforms. Command 2.2 is available now starting at $17,500.

Another new look for Novell

■ Novell, Inc. is set to announce yet another reorganization, this one designed to pare down the number of its product groups and to help address enterprise networks separately from smaller ones. Core products such as NetWare, GroupWise and NetWare Web Server will span both areas but have different development priorities in each, according to Novell officials.

Another Netscape groupie

■ Following in the footsteps of larger network operating system rivals, The Santa Cruz Operation, Inc. plans to announce this week that it will bundle Netscape Communications Corp.'s Communication server and Internet access software from Morningstar Technologies, Inc. with both Open Server and UnixWare.

No way, Uncle Sam

■ On the eve of releasing its Netscape Navigator 2.0 Web browser, Netscape Communications Corp. will not take Lotus Development Corp.'s route and trade government possession of its encryption key for permission to export a product with more than a 40-bit key length. Netscape is an emphatic participant in lobbying efforts to change the Feds' minds on this issue, but has strengthened its Secure Sockets Layer implementation.

IBM looks to make mainframe TCP/IP faster, more reliable

By Michael Cooney
Raleigh, N.C.

IBM mainframe shops looking to increase network uptime and improve application performance may appreciate new features the company is adding to its TCP/IP for MVS package.

The company this week will give TCP/IP for MVS users a level of fault tolerance and traffic-handling capabilities not previously available for IBM's big boxes running TCP/IP. Two new features make this possible: The first is Virtual IP Addressing (VIPA), a technique that provides backup routes for failed devices. The other is High Performance Native Sockets (HPNS), a high-speed API.

TCP/IP on the move

New and future features for IBM's TCP/IP for MVS:

- Support for tn3270E and Open Shortest Path First routing
- Fault tolerance
- Load-balancing
- High-speed TCP/IP sockets interface
- Closer interaction with VTAM and the front-end processor to better handle traffic flows

"As more and more mainframe shops deploy TCP/IP, we are working to add features that improve the reliability, stability and throughput of the TCP/IP for MVS package," said Bill Cassidy, IBM's technical marketing director for TCP/IP products.

VIPA in the TCP/IP for MVS package works by setting up a virtual address and device — a technique that gives the illusion of another box — between multiple hosts or between multiple images on a single host. If it detects a failure, the package uses the Routing Information Protocol to automatically reroute inbound TCP/IP packets to another address.

Without VIPA, TCP/IP for MVS users would have to manually redefine and reestablish mainframe sessions to alternative destinations.

"Users can also use this VIPA feature to segment traffic, such as [FTP] or telnet, onto a particular application on the mainframe," Cassidy added.

VIPA is available as a free Program Temporary Fix and ultimately will become part of the TCP/IP for MVS package, Cassidy said.

Equality for all

Analysts noted that in terms of fault tolerance, IBM is only playing catch-up to its primary rival in the mainframe TCP/IP world — Interlink Computer Sciences, Inc., which last year shipped TCPaccess Fault Tolerant, a feature for its own TCP/IP stack that allows rerouting around failures (*NW,* Jan. 16, 1995, page 12).

In an effort to consolidate multiple TCP/IP interfaces and improve application performance, IBM soon will add support for the high-speed HPNS interface.

HPNS will consolidate a number of existing application libraries, such as REXX, COBOL, File Transfer Protocol Server and Simple Network Management Protocol Server onto a single high-speed interface, Cassidy said.

"HPNS is the interface we expect users to migrate to, but we will continue supporting all of the other interfaces, too," Cassidy said.

HPNS will be available later this year. ■

Telecommunications

Net outages on the rise, despite SONET progress

By David Rohde

When your long-distance carrier starts touting subsecond restoral of network outages, you might want to take a closer look.

Despite several years of carrier investment in self-healing Synchronous Optical Network (SONET) rings, actual public network reliability got markedly worse in 1995, according to reports filed at the Federal Communications Commission.

And some of the carriers shouting the loudest about

See **Outages,** *page 97*

Heading the wrong way

Despite carriers' investment in SONET and other technologies, major long-distance outages were up last year, except at MCI.

	Reportable outages*		Blocked calls due to outages	
	1994	1995	1994	1995
AT&T	7	16	8.1 million**	4.5 million
MCI	19	9	23.9 million	1.7 million
Sprint	3	11	0.8 million	2.4 million

*Reportable outages are those lasting at least 30 minutes and affecting at least 30,000 customers. 1995 figures are through November.

**Includes 5.7 million blocked calls on Jan. 17, 1994, due to the earthquake in Southern California.

GRAPHIC BY TERRI MITCHELL SOURCES: FCC AND ALLIANCE FOR TELECOMMUNICATIONS INDUSTRY SOLUTIONS, WASHINGTON, D.C.

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Mini-applications rule the roost

By Carol Sliwa
Orlando

For Susan Vega, a technical analyst at Natural Gas Pipeline Co. of America in Lombard, Ill., the most exciting new product line unveiled at Lotusphere was Lotus Components, mini-applications that focus on selected tasks.

The Lotus Components Vega is so fond of are based on OLE custom control technology.

The Lotus Component Starter Pack has seven mini-applications: chart, data query, draw and diagram, file viewer, comment tool, project scheduler and spreadsheet.

"I think it's going to make it easier to sell to a user community that is tired of getting comfortable in applications only to have someone change them," Vega said.

"I really do see components as the next major wave for desktop applications in Notes," said Rick Flagg, president of Collaborative Solutions, Inc. in Cincinnati. "I can't tell you the number of times I've wanted just a snippet of a spreadsheet or a project chart in a Notes database. This is now the way to do it."

"If I need the hammer or screwdriver, why carry the whole toolbox?" said Thomas Sanchez, technology director for Houston-based Groupware Innovations, a Lotus business partner. "This conserves space on the laptop, and you've got that functionality on something that doesn't take forever to load up."

Others disagreed. "It was a nice consideration of them to toss it out there . . . But if they go away, we know we won't fuss," said Bill Quintrell, director of technology integration at Provident Life and Accident Insurance Co.

Not all high-volume Notes customers are sold on the initial set of components. Larry Lenihan, a principal of Broadview Associates L.P., a New York investment firm, said he would love to see Lotus come out with a word processing component. Broadview currently uses Microsoft Corp.'s Office on the desktop rather than Lotus's SmartSuite.

"We'd probably eliminate [Microsoft] Word on every desktop if we could get that," he said.

Targeted for availability in the second quarter, the Lotus Component Starter Pack will be free for volume SmartSuite/Notes users that are maintenance customers of the Lotus Passport Program. The introductory retail price is $19 per seat for volume customers that buy Notes through the Lotus Passport Program. Single-user licenses are $49 per seat. ■

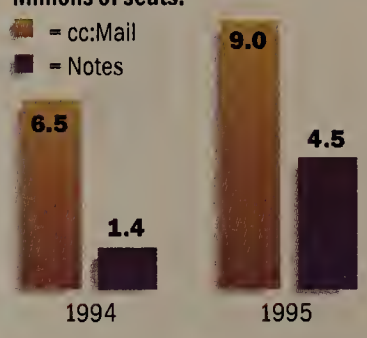
Lotus promises 8th version of cc:Mail

Fear not, cc:Mail users. A top Lotus Development Corp. official affirmed that the upcoming Release 7 client and DB8 Post Office for the company's popular electronic mail product will not mark the end of the line.

On the contrary, Lotus Chief Operating Officer Jeff Papows said 1996 fiscal plans "already contemplate beginning immediate work on the DB9 Post Office and the Version 8 clients. I expect that will continue certainly for the next three years; it's hard to predict beyond that point."

Don't forget about cc:Mail

While everyone knows the Notes installed base is growing fast, so is cc:Mail's.



Details on the future client and post office were sketchy. Andy Watt, director of cc:Mail product management, said that ubiquitous Web access, integrated forms, calendaring/scheduling on the Web and easier administration will figure prominently in future releases.

Lotus long has insisted that it remains committed to cc:Mail and is not trying to strong-arm its customers into migrating to the new inexpensive Notes Mail client.

But the firm has made it incredibly appealing for its customers to consider switching since the new cc:Mail Release 7 client can run against a Notes server for customers desiring client/server messaging. Release 7 is targeted for a midyear ship, although the response to the beta could change that, officials said.

Lotus' CommServer, which will integrate the cc:Mail and Notes databases, is expected to be ready sometime during the first half of this year, according to a company spokesman.

The cc:Mail Release 6 Windows client, currently in the second round of beta testing, and DB8, which features around-the-clock uptime, are targeted for May release.

— Carol Sliwa

Father of Notes hints about a future with Java

Ray Ozzie, the father of Lotus Notes, is reluctant to discuss his child's future. After all, why tip off the competition about Release 5 when Release 4 is just being launched?

But flanked by the Notes development team last week at Lotusphere, Ozzie did mention that:

- More mini-application components are on the way.
- "The browser aspect of Notes will be able to execute Java applets off the 'Net."
- "The use of Java or JavaScript as alternate programming languages in the Notes environment is something we're toying with. That's specifically going to be customer driven. There's no technological change there. It would just be additional little check boxes. Do you want to program your @ functions, LotusScript, Java or JavaScript?"

— Carol Sliwa

New tools let users create Internet-based applications

By Carol Sliwa
Orlando

The software that Lotus Development Corp. created to let its customers publish information onto the Web will be made commercially available for conducting business over the Internet.

The Cambridge, Mass.-based firm announced last week at its Lotusphere customer conference that it will sell the building blocks programmers can use to construct Notes-based "electronic application frameworks," or eApps. It is targeting four business areas: publishing, commerce, marketing and customer service.

The idea came from Lotus' experience with Newsstand, its electronic publishing service, according to Jim Dougherty, general manager of the Lotus Internet Applications group.

Newsstand enables customers to create sophisticated documents using Lotus publishing tools and upload them to a Lotus-hosted Newsstand server for distribution to other Notes servers.

Last year, Lotus made plans to expand the service to allow customers to publish documents on the Web, accessible to anyone with a Web browser and authorization to read the documents (*NW*, Dec. 11, 1995, page 1). Lotus handles the credit card validation, user authentication and security.

Rather than offering a similar service for other business opportunities, Lotus elected to make the tools, or building blocks, available to business partners and customers so they can customize their own Web-enabled business applications.

For instance, businesses that want to sell products or provide customer service over the Internet can either hire a developer to build applications using Lotus' eApps tools or do it themselves.

The customer need not be a Notes user, but the business selling its goods or marketing its products must have Notes on the back end. That doesn't mean that the company must have an entire Notes infrastructure. It can have as little as one Notes server, Dougherty said.

Lotus Notes:Newsstand on the Web, the first implementation of a publishing eApps framework, will be available in the second quarter. It is based on the HTTP server, InterNotes Web Publisher and Notes server bundle that Lotus expects to deliver in the first quarter.

Lotus has not set a date for general availability of the rest of eApps. The tools unveiled at Lotusphere sparked applause among more than 1,200 attendees during two sessions. ■

Lotus

Continued from page 1

nooga, Tenn.-based Provident Life and Accident Insurance Co.

"Night and day" was how Janet Allen, president of the Houston-based Groupware Innovations consulting firm, sized up Notes vs. the rest of the pack. Allen said the lower Notes client prices, Web/Internet integration and articulation of a clear message "will take Lotus into the future."

Lotus executives were none too shy about the fact that their archrival, Microsoft Corp., hasn't even released the first version of its answer to Notes — the long-delayed Exchange Server, due out this quarter.

"Notes is much more of a total groupware platform, and Exchange is souped-up electronic mail," said Patricia Seybold, president of Boston-based Patricia Seybold Group, Inc.

Seybold said customers have been asking whether they should stop deploying Notes and opt for the Web or consider another product. "When I went down to Orlando, I would have given Notes an additional two-year life span, and now it looks more like another at least four to five years."

Rob Enderle, a senior analyst at the Santa Clara, Calif., office of the GIGA Information Group consultancy, said Novell, Inc. may have the best product with GroupWise. "But customers aren't sure about what's going to happen to Novell," he said.

According to Enderle, "[Notes has] at least two more years as the leader in its niche, but I don't think people are looking for another proprietary platform in the long run." ■

BETTER THAN DISNEY?

Even the warm Florida sunshine couldn't lure attendees away from the Lotus conference. Many sessions were standing-room only, and people often were turned away from overcrowded rooms. The simple insertion of a calendar or a spreadsheet into a Notes document could inspire unbridled applause.

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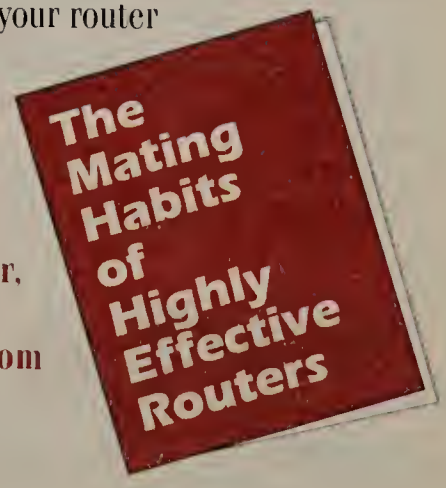

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Internetworking

3Com to showcase ATM offerings at ComNet '96

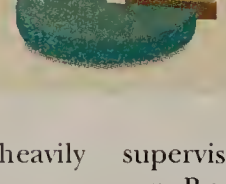
By Jodi Cohen
Washington, D.C.

While users seem to agree that Asynchronous Transfer Mode is the network technology of the future, few are actually implementing it.

So 3Com Corp. will try to simplify the migration to ATM by announcing at ComNet '96 here this week that its ATM switch will now support Ethernet and fast Ethernet.

The company also will make some ATM-related announcements for users of the Oncore switching hub, obtained via its acquisition of Chipcom Corp. last year. 3Com will announce ATM modules for the backbone hub and outline plans to ditch IBM as a major ATM technology partner. Chipcom relied heavily on IBM.

Only 28% of all desktop machines will be networked via ATM in the year 2010, according to Thomas Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J.



The highlight of 3Com's ComNet announcement will be two new switching modules that support 10M or 100M bit/sec Ethernet links to the company's Cellplex 7000 ATM backbone switch.

One module offers 12 10Base-T ports and three 155M bit/sec ATM links. The other has 16 100Base-T ports, according to an analyst briefed by the company.

The Cellplex is a four-slot device that can support as many as 16 155M bit/sec ATM ports.

The box can handle up to 2.56G bit/sec of traffic and supports as many as 4,096 virtual circuits per port.

3Com officials were not available for comment.

3Com user Jerry Croce, supervisor of computer support at Ericsson Business Communications, Inc. in Cypress, Calif., said he is pleased that 3Com is expanding the functionality of the Cellplex beyond just ATM connectivity.

"We won't have every desktop running ATM for the forseeable future. So if the hub could do ATM and Ethernet switching, I could swap in new cards as our needs change," Croce said.

Not ATM only

Charlie Robbins, vice president of communications research at Aberdeen Group, Inc., a consultancy in Boston, said 3Com's move demonstrates the lack of a mainstream market for pure ATM devices.

"Fore used to think it could be an ATM-only vendor, but now it realizes it needs to provide Ethernet switching devices as seen by their acquisitions of Alantec and [Applied Network Technologies, Inc.]," he said. "3Com's move with the Cellplex is the same thing — the ATM market is just not there yet."

Analysts said that Newbridge Networks, Inc. and Cisco Systems, Inc. are part of a shrinking group of vendors that offer ATM-only switching devices. But there is speculation that Cisco will soon add LAN switching modules for its LightStream 1010 pure ATM switch.

Some industry observers said 3Com should add Ethernet-to-ATM and fast

See **ATM,** *page 98*

3Com beefs up fast Ethernet, remote access devices

By Jodi Cohen
Santa Clara, Calif.

3Com Corp. last week offered its Ethernet switch customers a tenfold boost in bandwidth with new 100M bit/sec uplink modules.

Separately, the company announced a Windows NT-based security package for users of its remote access devices.

The fast Ethernet rollout includes single-port 100M bit/sec modules for the LANplex 2500 and 6000 Ethernet backbone switches, providing customers with a new high-speed server connectivity option.

"We're ready to migrate to fast Ethernet, but our Kalpana Ethernet switches are not," said Chris Martin, senior data processing specialist at Plymouth Rock Assurance Corp. in Boston. "So our file servers will be moved from the Kalpana switches to 3Com 100Base-T hubs connected to the LANplex 2500."

The LANplex 2500 can support as many as two fast Ethernet modules, which

See **Fast Ethernet,** *page 98*

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Circle Reader Service # **52**

Tool puts client/server apps on the 'Net

By John Cox
Mountain View, Calif.

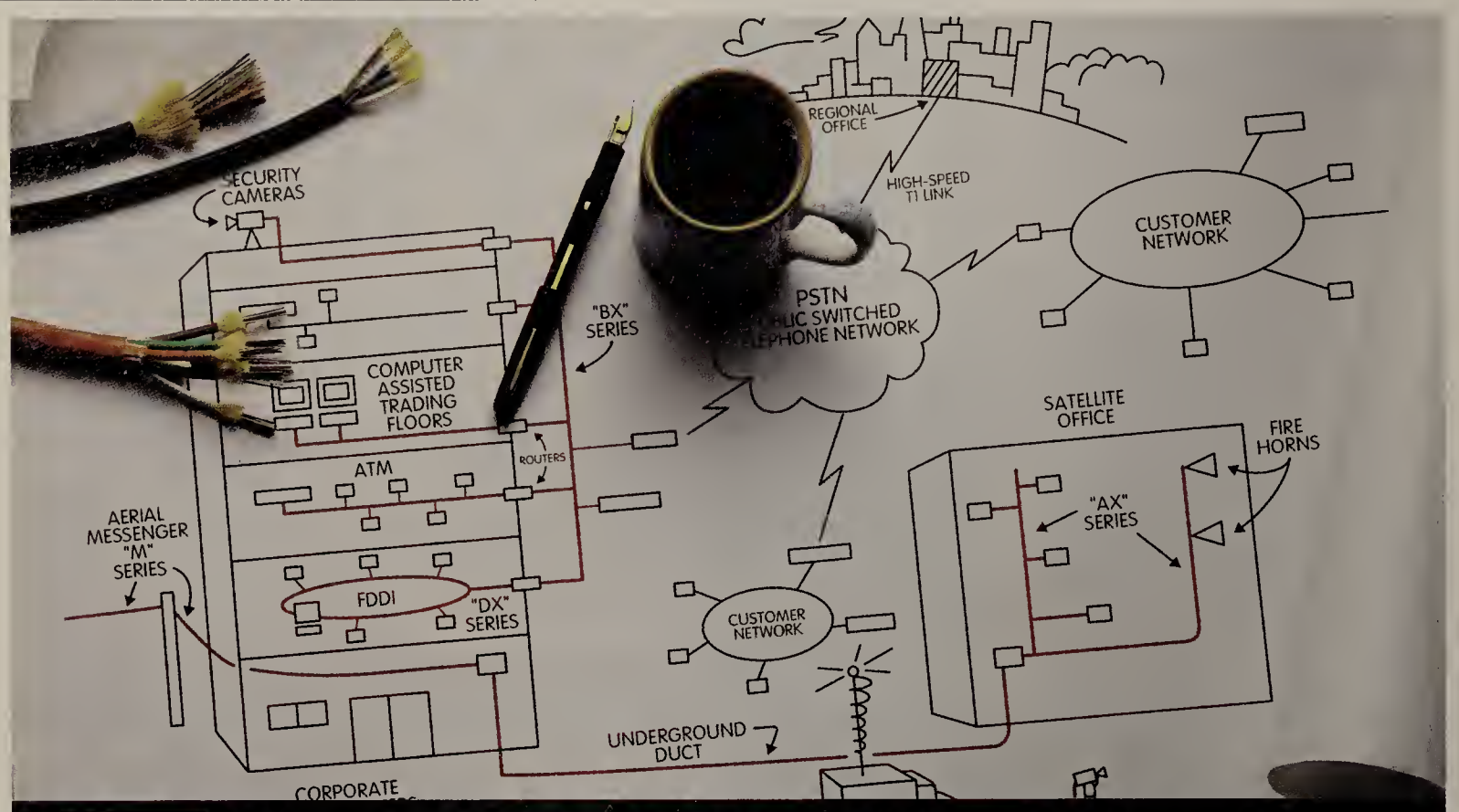
A Silicon Valley start-up is about to give the computer industry an object lesson on how to build Internet-based client/server applications.

Wayfarer Communications, Inc. this week will release Wayfarer QuickServer, which is a set of API calls, a graphical administration tool and a high-performance message router designed for low-bandwidth networks such as the Internet.

With these components and standard development tools such as Visual Basic and PowerBuilder, corporate application developers can build and deploy client/server applications that run across the wide area and perform as if they were on a LAN.

The client part of the applications can run on Windows or, more interestingly, can be integrated with popular Web browsers such as Netscape Communications Corp.'s Navigator or Microsoft Corp.'s Explorer. A browser-based application can serve as an entry point to back-end, transaction-oriented application servers, SQL databases and business rules. That's a far cry from browsers reading sequentially through static collections of HTML documents on a Web server.

Conceptually, QuickServer is simple. In effect, Wayfarer inserts a high-performance message router between the client and server portions of an application written in Visual Basic, PowerBuilder or Microsoft Visual C++. A handful of new API calls lets both portions call the message router, which handles all the communications over the WAN and provides an array of security, management and data integrity services.



NetworkWorld Fusion
http://www.nwfusion.com

Read up on Internet application development. Resources include:

- **A downloadable copy of Wayfarer's StockWatch demo**
- **Info on Microsoft Visual Basic Script, a key component of QuickServer**
- **A look at Oracle's competing WebServer**

Select News+ then Client/Server Applications.

QuickServer Message Router uses a multithreaded engine and efficient, lightweight messaging protocols designed to minimize the amount of network traffic generated. Colby claimed the router boosts application performance by 10 times or more compared to performance over typical internets.

Clients connect to the router over WAN or Internet connections. But the router itself and what Wayfarer calls server agents run on a high-speed LAN. These agents are programs, written in the same language as the clients, that access databases or perform complex, compute-intensive jobs.

Wayfarer executives made astounding performance claims for QuickServer and are trying to prove them with a stock quote application called StockWatcher. The application, written in Visual Basic, runs on the company's Web site along with the results of performance tests. StockWatcher receives stock quote data from a live, satellite-based data feed from PC Quote, Inc. in Chicago.

End users log on via a Netscape browser and select the stocks they want to

See **Wayfarer,** ***page 96***

CLARIFICATION

Network World mischaracterized Texaco, Inc.'s policy regarding employee browsing of Internet sex sites.

Texaco monitors employees' use of the 'Net and contacts either the employee or his manager when the company's acceptable-use policy has been violated. The firm does not, however, issue a corporate memo about specific violations.

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SEE PENRIL AT COMNET '96, BOOTH #826
JANUARY 30 – FEBRUARY 1

Circle Reader Service #58

ATM backbone switch resized by StrataCom

By Tim Greene
San Jose, Calif.

StrataCom, Inc. at ComNet '96 this week will introduce several new products designed to make its ATM offerings scale precisely to user needs.

For users looking to employ Asynchronous Transfer Mode as an enterprise backbone but not finding the right size switch, StrataCom is introducing an eight-slot version of its 1.2G bit/sec IGX switch.

It is also offering voice and port concentrators that let users with IGX or smaller IPX switches in their networks make better use of switch ports.

With the addition of the IGX 8, the IGX comes in eight-, 16- and 32-slot models.

Two slots on the IGX 8 are for processors, and six slots are for trunk or port modules. The IGX 8 ranges in price from $25,000 to $100,000 and will be available in the second quarter.

The company will announce a port concentrator for its IPX and IGX switches to expand the capacity of a single port on the switch to 44 ports for V.35, X.21 or RS-232 interfaces. Port speeds range from 9.6K to 384K bit/sec. Also, the concentrator supports Synchronous Data Link Control, High-Level Data Link Control, X.25 and bisynchronous protocols. The shelf costs $20,000 to $40,000 and will be available sometime this quarter.

Phil Whitehouse views the eight-slot IGX as a way to migrate easily to T-3 trunking as demand increases on the net.

A voice shelf being introduced for the IPX and IGX lets the switches support low bit rate voice connections and allows terminating 8K bit/sec Algebraic Code Excited Linear Projection voice connections on IPX and IGX switches. Each shelf terminates up to 24 voice channels.

The shelf is for enterprise users that want to use less bandwidth on voice traffic. It is available in the second quarter and priced at $20,000 to $30,000.

Phil Whitehouse, communications engineer for Central Maine Power Co., uses the smaller StrataCom IPX switch to trunk T-1 lines but views the eight-slot IGX as a way to migrate easily to T-3 trunking as demand increases on the net. He also liked the idea of the voice concentrator because it eliminates the need for separate frame relay access devices at both ends of a frame relay connection. And the port concentrator allows additional smaller bandwidth remote connections to the utility's IPX switches, he said.

StrataCom also is doubling the capacity of its BPX backbone switch from 10G to 20G bit/sec. Designed for large nets, the 20G bit/sec backplane started shipping Jan. 1. Pricing for the switch has not been determined.

In addition, the company will announce that it will support the ATM Forum's private network-to-network interface standard that is expected to be approved in April.

©StrataCom: (408) 294-7600.

Remote access

GDC takes on a partner to round out its access line

By Tim Greene
Middlebury, Conn.

General DataComm, Inc. (GDC) has found a way to plug holes in its remote access line by partnering with Equinox Systems to develop two new products, the company will announce at ComNet '96 this week.

This effort will help reduce congestion on central-site corporate LANs by letting remote users bypass the LAN to access servers.

Equinox, based in Sunrise, Fla., will design and build a new backplane for the GDC SpectraComm 5000 remote access shelf, which is a modular, server-based T-1 access device that can support a variety of interfaces.

The new backplane will allow the shelf to port as many as 30 modems and offer direct access from the SpectraComm 5000 to a central-site server.

The platform supports dial-up access and dedicated T-1 access. In addition, it can demultiplex channels aggregated from several remote sites onto a single T-1.

For smaller central sites, Equinox will develop a four-port, V.34 modem board for the central server. It will come in EISA, ISA, PCI, Unix and Micro-channel models.

The new products will be available in April, but prices have not yet been set.

The company will also announce a new desktop V.34 modem called Quester, available immediately, that costs $395.

REMOTE ACCESS IN THE YEAR 2000

- There will be **55 million** telecommuters.
- It will cost **$1,500** to equip each telecommuter.
- Central-site wide-area access units will support **10 users** per port.

SOURCE: THE GARTNER GROUP, STAMFORD, CONN.

Voice to get free ride from frame

Vendors gamble that users will want to send voice traffic over frame relay lines.

By Tim Greene
Washington, D.C.

The age-old lure of getting something for nothing still works — at least that's what vendors of voice-over-frame-relay technology hope.

Nuera Communications, Inc., a start-up making its debut at ComNet '96 this week, is betting that users want to ship packetized voice for free over spare bandwidth on existing corporate frame relay lines.

And that's what AT&T Global Business Communication Systems (GBCS) seems to think, too, judging from its purchase of private-label versions of three of Micom Communications Corp.'s voice and data frame-relay multiplexers.

Nuera's initial splash will be made with AccessPlus F100, a frame relay access device and switch that can interface with analog phones, faxes, private branch exchanges and routers to aggregate branch office traffic at T-1 speeds and below.

The company says that its products will be software configurable to support ATM or time-division multiplexed traffic, giving users flexibility if their network needs change.

While the company is officially only about a month old, it is more than just a start-up. It is made up of the former Clarity Products division of Pacific Communication Sciences, Inc. and owns the PCSI Clarity line, of which Access Plus F100 is an extension.

FLEXIBLE VOICE OPTIONS

Nuera's AccessPlus F100 can packetize the traffic on some voice channels for private network delivery and leave other voice traffic intact for distribution over the public switched network.

"They're a start-up with cash flow," said Tim Zerbiec, a principal with Perception Management, Inc., a consultancy in Mt. Shasta, Calif.

He said the company's voice compression algorithms produce "very good to excellent" voice quality in comparison to toll-call quality.

The Nuera box has eight slots and supports frame relay ports at speeds in multiples of 56K and 64K bit/sec. One-port analog and four-port digital voice/fax cards are also available.

The device can squeeze extra voice channels out of a T-1 by reducing the bandwidth needed for signaling from 64K to 8K bit/sec, according to Andrew Voss, Nuera vice president of marketing. That leaves 56K bit/sec for seven more 8K bit/sec compressed voice channels, Voss said.

It can also route calls so the voice net is fully meshed even if the frame relay network is not.

The unit comes with a standard network port that can run at speeds up to 512K bit/sec, but T-1 and E-1 cards with channel service units built in are also available. Those cards offer the option of channelizing voice traffic. That means all phone traffic from a PBX could be fed through the AccessPlus FI00, and the device would packetize calls bound for elsewhere on the private network and leave calls to the public network alone (see graphic).

The basic AccessPlus unit costs $4,250. Analog voice/fax cards cost $1,595, while digital voice/fax cards cost $4,450 and digital T-1 and E-1 cards are priced at $2,200.

GBCS purchase

Meanwhile, AT&T's equipment division is buying the Micom Marathon 300, 500 and 2000 integration multiplexers, which can take most LAN and voice traffic and put it out on wide-area links, including leased lines, ISDN and frame relay.

But AT&T's interest is in frame relay, according to Dan Fusco, marketing manager for AT&T GBCS. "With rapid acceptance of frame relay, these new integration multiplexers will allow us to offer one-stop shopping for data, voice, fax and LAN applications over frame relay anywhere in the world."

©Nuera: (619) 625-2400. ■

Also this week, GDC will announce Motivity, a framework that divides all of the company's access product line into three segments: Value, Professional and Central.

Value includes the new Quester modem as well as single data service unit/channel service unit (DSU/CSU) for remote sites such as a telecommuter's home office.

Professional is for remote offices and includes modems, CSUs and DSUs that can be managed either by GDC's proprietary NMS management system or by Simple Network Management Protocol.

One example of an application employing the Professional line is to terminate 56K bit/sec frame relay circuits at remote offices using the SNMP 540 IFP DSU. Traffic from several such offices would be aggregated on a single T-1 bound for a central site, and terminated with an SNMP 553 SD1 DSU, the company said.

Central is built around the SpectraComm 5000 shelf, which can be fitted with cards to interface with routers and is designed to eliminate channel banks, modem banks and the cabling between them. It can port as many as four T-1s, and additional shelves can be added as usage increases. ■

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If military, please specify branch and base: _____

If government, please specify division: _____

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/ Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs, Distributors)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)*_____

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)*_____

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

A	B		
❑	❑	100	**LOCAL-AREA NETWORKS**
☐	☐	01.	Local-Area Networks
☐	☐	02.	Network Op. Sys. Software
☐	☐	03.	LAN Storage/Backup
☐	☐	04.	Optical LAN Storage/Backup
☐	☐	05.	Disk LAN Storage/Backup
☐	☐	06.	Tape LAN Storage/Backup
☐	☐	07.	RAID LAN Storage/Backup
☐	☐	08.	Network Test/Diagnostic Tools
☐	☐	09.	Cables, Connectors, Baluns
☐	☐	10.	UPS
☐	☐	11.	Network Interface Cards
☐	☐	12.	Peer-to-Peer LANs
☐	☐	13.	SNMP Network Management
☐	☐	14.	ATM Switches
☐	☐	15.	Token-Ring Switches
☐	☐	16.	Ethernet Switches
☐	☐	17.	Remote LAN Access/Communications Servers
☐	☐	18.	Superservers
☐	☐	19.	File/Application Servers
☐	☐	20.	Print Servers
❑	❑	101	**INTERNETWORKING**
☐	☐	21.	Bridges
☐	☐	22.	Routers
☐	☐	23.	Bridge/Router
☐	☐	24.	Gateways
☐	☐	25.	Intelligent Hubs/Stackables
❑	❑	102	**COMPUTERS/PERIPHERALS**
☐	☐	26.	Laptops/Notebooks/Sub-Notebooks
☐	☐	27.	Micros/PCs
☐	☐	28.	Minis
☐	☐	29.	Mainframes
☐	☐	30.	Workstations
☐	☐	31.	Terminals
☐	☐	32.	Printers
☐	☐	33.	Cluster Controllers
☐	☐	34.	Monitors
☐	☐	35.	Fax/Modem Boards
❑	❑	103	**REMOTE/WIRELESS COMPUTING**
☐	☐	36.	PDAs
☐	☐	37.	PCMCIA Devices
☐	☐	38.	Wireless Data Services
☐	☐	39.	Wireless Data Equipment
☐	☐	40.	Wireless LANs
☐	☐	41.	Cellular Equipment & Services
❑	❑	104	**INTERNET/ELECTRONIC COMMERCE**
☐	☐	42.	Internet Access Providers
☐	☐	43.	Firewalls
☐	☐	44.	Web Servers/Browsers
☐	☐	45.	Internet Software Tools
❑	❑	105	**SOFTWARE/APPLICATIONS**
☐	☐	46.	Network Management
☐	☐	47.	Systems Management
☐	☐	48.	Security
☐	☐	49.	Communications Software
☐	☐	50.	Terminal Emulation
☐	☐	51.	Word Processing
☐	☐	52.	Operating Systems
☐	☐	53.	Client/Server Applications Development
☐	☐	54.	Database Management/RDBMS
☐	☐	55.	Spreadsheet
☐	☐	56.	Groupware
☐	☐	57.	EDI
☐	☐	58.	E-mail
☐	☐	59.	Windows/Graphical User Interface
☐	☐	60.	Multimedia
☐	☐	61.	Graphics/DTP
☐	☐	62.	Remote Access
☐	☐	63.	Imaging
☐	☐	64.	Suites
☐	☐	65.	Middleware
☐	☐	66.	Document Management
☐	☐	67.	Database Server
☐	☐	68.	Site Metering Tools
☐	☐	69.	Computer-Integrated Telephony (CIT)
❑	❑	106	**WIDE-AREA NETWORK EQUIPMENT & SERVICES**
☐	☐	70.	Frame Relay Equip./Services
☐	☐	71.	Modems
☐	☐	72.	FT-1/T-1/T-3 Multiplexers
☐	☐	73.	FT-1/T-1/T-3 Services
☐	☐	74.	SONET
☐	☐	75.	Inverse Multiplexers
☐	☐	76.	SMDS
☐	☐	77.	Asynchronous Transfer Mode
☐	☐	78.	Diagnostic/Test Equipment
☐	☐	79.	DSU/CSU
☐	☐	80.	VSAT/Satellite
☐	☐	81.	ISDN Equipment & Services
☐	☐	82.	PBXs
☐	☐	83.	Voice Mail/Response
☐	☐	84.	Videoconferencing
☐	☐	85.	Leased Lines
☐	☐	86.	Switched Data
☐	☐	87.	E-mail/On-line Services
☐	☐	88.	800/900/MTS Services
☐	☐	89.	Virtual Networks
☐	☐	90.	Outsourcing/Systems Integration Services
☐	☐	91.	Education/Training Services
☐	☐	92.	None of the above (1-91)

6 What is the total number of LANs, workstations/nodes at this location/ in your organization?

	At this location: LANs	At this location: Workstations/ Nodes	Entire organization: LANs	Entire organization: Workstations/ Nodes
1.	☐ 5,000+	☐	☐ 5,000+	☐
2.	☐ 1,000 - 4,999	☐	☐ 1,000 - 4,999	☐
3.	☐ 100 - 999	☐	☐ 100 - 999	☐
4.	☐ 50 - 99	☐	☐ 50 - 99	☐
5.	☐ 10 - 49	☐	☐ 10 - 49	☐
6.	☐ 1 - 9	☐	☐ 1 - 9	☐

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

A	B		
❑	❑	55	**NETWORK ARCHITECTURES**
☐	☐	01.	SNA
☐	☐	02.	DECnet
☐	☐	03.	TCP/IP
☐	☐	04.	Novell IPX/SPX
☐	☐	05.	APPC/APPN/LU 6.2
☐	☐	06.	NETBIOS
☐	☐	07.	AppleTalk
☐	☐	08.	NFS
☐	☐	09.	Other *(please specify)*_____
❑	❑	56	**NETWORK OPERATING SYSTEM**
☐	☐	10.	Microsoft (LAN Manager)
☐	☐	11.	Novell (NetWare 2.X, 3.X)
☐	☐	12.	Novell (NetWare 4.X)
☐	☐	13.	Windows NT
☐	☐	14.	Windows NT/Advanced Server
☐	☐	15.	LocalTalk (AppleTalk)
☐	☐	16.	Banyan (VINES)
☐	☐	17.	IBM (LAN Server)
☐	☐	18.	IBM (PC LAN Program)
☐	☐	19.	Artisoft (LANtastic)
☐	☐	20.	Digital (Pathworks)
☐	☐	21.	Other *(please specify)*_____
❑	❑	57	**LAN ENVIRONMENT**
☐	☐	22.	4M Token Ring
☐	☐	23.	16M Token Ring
☐	☐	24.	Ethernet
☐	☐	25.	100M Ethernet
☐	☐	26.	StarLAN
☐	☐	27.	FDDI
☐	☐	28.	LocalTalk
☐	☐	29.	10Base-T
☐	☐	30.	ATM
☐	☐	31.	Other *(please specify)*_____
❑	❑	58	**COMPUTER OPERATING SYSTEM**
☐	☐	32.	DOS
☐	☐	33.	Unix/Xenix/AIX
☐	☐	34.	OS/2
☐	☐	35.	OS/2 Warp
☐	☐	36.	IBM MVS
☐	☐	37.	IBM VM
☐	☐	38.	Digital VMS
☐	☐	39.	Macintosh
☐	☐	40.	Windows
☐	☐	41.	Windows 95
☐	☐	42.	X Window System
☐	☐	43.	Solaris
☐	☐	44.	Other *(please specify)*_____
☐	☐	45.	None of the above (1-44)

8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Do you have or plan to install client/server networks? ☐ Yes ☐ No

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

	Mainframes A – Installed	Mainframes B – Planned		Minis C – Installed	Minis D – Planned
1.	IBM ☐	☐	1. IBM	☐	☐
2.	Amdahl ☐	☐	2. Digital	☐	☐
3.	Cray ☐	☐	3. Tandem	☐	☐
4.	Hitachi ☐	☐	4. Unisys	☐	☐
5.	Unisys ☐	☐	5. AT&T GIS	☐	☐
			6. HP	☐	☐
			7. Data General	☐	☐

Which of the following do you have installed/planned: (USE NUMBERS ONLY)

	At this location: E – Servers	At this location: F – Clients/Nodes	Entire organization: G – Servers	Entire organization: H – Clients/Nodes
1. Power PC				
2. Power Macintosh				
3. Macintosh (Other)				
4. Pentium-based				
5. 80486-based				
6. 80386-based				
7. 80286-based				
8. RISC-based workstations				
9. Other				

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:		Entire organization:	
1. ☐ Over 10,000	4. ☐ 1,000 - 2,499	1. ☐ Over 10,000	4. ☐ 1,000 - 2,499
2. ☐ 5,000 - 9,999	5. ☐ 500 - 999	2. ☐ 5,000 - 9,999	5. ☐ 500 - 999
3. ☐ 2,500 - 4,999	6. ☐ 499 or less	3. ☐ 2,500 - 4,999	6. ☐ 499 or less

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Briefs

■ **The Federal Communications Commission** *approved a new* **voice messaging service** *from Ameritech Corp. that forces delivery of messages to individuals without answering devices or voice mail.*

*The Message Delivery Service enables businesses to record personalized messages when they encounter a busy signal or no answer, then makes repeated attempts to deliver the message until the call is answered (*NW, *July 31, 1995, page 17).*

■ **Radcom Equipment, Inc.** *will announce at ComNet '96 this week Frame Relay Troubleshooter, software that lets its WAN/LAN analyzer* **monitor WAN frame relay lines** *and detect the source of erroneous frames. Available now, it will be bundled with Radcom's Frame Relay Analysis package for $1,995.*

Radcom: (201) 529-2020.

■ **MCI Communications Corp.** *and* **Siemens Rolm Communications, Inc.** *announced a series of agreements to* **sell each other's products.** *The marketing deal between the No. 2 long-distance carrier and the No. 3 maker of private branch exchange systems is said to be worth $1 billion to MCI over five years.*

Among the offerings are discounts on MCI's HyperStream frame relay service for Siemens customers.

■ **Motorola, Inc.'s Cellular Infrastructure Group (CIG)** *has withdrawn from negotiations with* **Sprint Telecommunications Venture** *for its personal communications services (PCS) network, Motorola said last week.*

To date, Motorola's CIG is slated to provide new PCS systems for two of the four largest U.S. operators, all of which have selected Code Division Multiple Access digital cellular technology as their PCS platform.

Fast-packet services

EMI offers new managed service

By Tim Greene
Syracuse, N.Y.

EMI Communications Corp. this week will announce at ComNet '96 that it has fine-tuned its network to offer frame relay services for delay-sensitive traffic, specifically SNA and voice.

With its SNA service, EMI guarantees 100% session uptime or it will pay back the user at double or quadruple the outage, depending on where the fault occurs.

NetworkWorld

Interested in SNA-to-frame relay migration? Then read all about vendor strategies and how users are taking the plunge. Select News+ then WANs & Internetworking.

EMI also unveiled an alliance with two vendors — ACT Networks, Inc. and Memotec Data, Inc. — to offer voice over frame relay, provide customer premises equipment (CPE) and assign top-level priority for the traffic.

With the SNA service, tentatively called Priority Plus for SNA, EMI joins Sprint Corp., AT&T, MCI Communications Corp. and Cable & Wireless, Inc. in offering frame relay for SNA. Priority Plus for SNA will be in limited availability next month with a full rollout scheduled for April 1.

Beth Gage, senior analyst at TeleChoice, Inc., a consultancy in Verona, N.J., said support for equipment and testing between the network and CPE are key elements to a good frame relay SNA service, and EMI is doing both.

For $500 per month, the user gets a data service unit/channel service unit, a router and local-loop connections to the remote site and the host at 56K bit/sec with 16K or 28K bit/sec committed information rate.

If the service fails in the local loop, which is leased, EMI will give the user a two-for-one credit. "We're actually crediting other people's networks at that point," said Mark Pugerude, EMI's director of product development. If the failure is on the EMI network, the credit is four-for-one.

Installation costs between $550 and $700 but can go higher if the job requires inside wiring. The initial port fee and the cost of establishing local loops can run up to $1,200, he said.

To reduce congestion, EMI has cut back the load on its Cascade 900 switches by changing the total bandwidth of permanent virtual circuits (PVC) running through them from five times their capacity to twice the switches' capacity, Pugerude said.

The SNA service also includes static PVCs through the network, as opposed to ones that are established based on routing algorithms that determine the shortest route through the network at any given moment, he said. Setting up static PVCs takes more administrative time and bumps up the price.

EMI is testing CPE from Cisco Systems, Inc., Sync Research, Inc. and Ascom Timeplex, Inc. to certify their equipment as part of the package.

The service also includes management of routers and frame relay access devices, and problem resolution for alarms, either remotely or on-site.

The company has also tested and endorses devices from ACT Networks and Memotec for voice over frame relay. The service is designed for intraenterprise voice traffic, which would ride the EMI network as priority traffic. It would not get statically defined PVCs as provided for the guaranteed SNA service.

✆EMI: (315) 433-0022.

SNA WITHOUT DELAY

What's it called?
Priority Plus for SNA frame relay service

Who's it from?
EMI Communications in Syracuse, N.Y.

What is it?
- DSU/CSU
- Router
- Local-loop connections
- 56K bit/sec frame relay service
- 100% session uptime guaranteed

How much does it cost?
$500 per month, plus installation and initial line charges

Vendors align to boost SNA connectivity

By Michael Cooney
Pittsburgh

It's not even spring and SNA vendors are already getting cozy.

For instance, Computerm Corp. this week will team up with Microsoft Corp. to give LAN users high-speed access to mainframe resources.

Computerm will introduce Virtual Mainframe Channel (VMC) SNA Server, an integrated package of hardware and software that includes Microsoft's SNA Server package and Computerm's VMC gateway. The aim is to give users the ability to funnel large amounts of mixed SNA and LAN traffic directly onto a mainframe channel or token ring-attached Application System/400 host.

"The idea is to offer one-stop shopping for high-speed SNA and TCP/IP connectivity," said Don Imhoff, net gateways product manager at Computerm.

VMC SNA Server is built on a 100-MHz Intel Corp. Pentium processor and can support up to six token-ring, Ethernet or FDDI LAN connections.

Using the SNA Server software, the box can support as many as 2,000 users and up to 10,000 SNA logical unit sessions with the mainframe. The software supports the conversion of TCP/IP, IPX, Named Pipes, VINES and AppleTalk to SNA protocols, giving remote client access to resources on both the

See **SNA connectivity,** *page 24*

ISDN yields yet another forum

By Joanie Wexler
San Ramon, Calif.

Several large WAN vendors have formed yet another industry forum, this one designed to ensure that ISDN doesn't blow its potential as the Internet access vehicle of choice.

AT&T Network Systems, Ascend Communications, Inc., 3Com Corp. and U.S. Robotics said last week they have established the ISDN Forum to develop common technology that relieves users from having to configure their premises equipment to match parameters in central-office switches. That configuration burden, the firms claimed, is holding back mass user acceptance of ISDN.

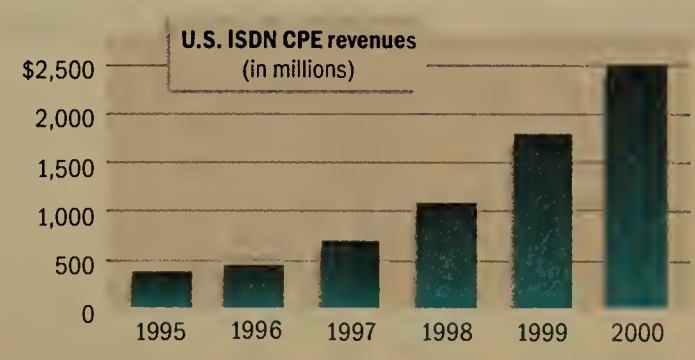
Automation in setting up new communications links is desirable, industry observers agreed, but its impact on buying decisions is unclear.

"There are still many technicalities users must know to configure their equipment," said Jim Bryce, cochairman of the Texas ISDN Users Forum's regulatory committee in Austin. Switch-makers AT&T, Northern Telecom, Inc. and Siemens

See **ISDN,** *page 24*

ISDN's steady rise

Sales of gear that lets users grab big chunks of WAN bandwidth, such as ISDN CPE, are projected to grow steadily — unless interoperability problems interfere.



GRAPHIC BY TERRI MITCHELL

SOURCE: TELEMAC, FOSTER CITY, CALIF.

INTERNETWORKING MONITOR

Men, women, SVCs and SMDS

Some pundits believe switched virtual circuits (SVC), soon to be available with frame relay and ATM, will make Switched Multimegabit Data Service obsolete. But this is probably not so.

Fact is, these services are as different as men and women. Women, for instance, are usually better at eating chocolate, asking for directions and wearing high heels. Men, however, are better at using power tools, belching and channel surfing.

Even with SVCs, frame relay and ATM are still connection-oriented technologies. Like men, frames and cells in a connection-oriented network never stop and ask for directions. Unlike men, SVCs always know exactly where they are going since the path is predetermined at the time the connection is established.

SMDS, on the other hand, is connectionless. Each cell of information is independently routed through the network with the best path chosen based on the destination address.

Because of these innate differences, the connectionless nature of SMDS makes it better suited for some environments and applications than connection-oriented SVCs. For example, large nets with a high level of direct interconnectivity may get better performance and response times with SMDS than with SVCs since the SVC connection and its speed must be individually negotiated between the customer premises equipment (CPE) and the network each time a connection is required. This signaling takes time and processing power.

Todd Hirsch, president of the SMDS Interest Group, said broadcast data applications may be better suited to SMDS than SVCs. Another advantage of SMDS is that you can set up group addresses to designate closed user groups.

The predominate applications for SVCs are still being flushed out. Logically, SVCs would be well suited to handle specific applications or connections when operating in conjunction with a permanent virtual circuit (PVC) environment. For example, PVCs can be used between locations with heavy traffic volumes, while SVCs can be used to support connections between remote locations that cannot cost-justify a PVC.

Daniel Briere and Christine Heckart

SVCs also could be used to support applications such as voice over frame relay, videoconferencing on frame relay or ATM, or overflow traffic during busy hours. This all makes sense since voice and real-time video over a connectionless service is about as graceful as a man in high heels. It just isn't pretty.

Though different, men and women are equally well equipped to bake pies, change tires or diapers, and mow the lawn. Similarly, some network applications can be supported equally well by either a connection-oriented or connectionless service. An average-size data network that does not have broadcast requirements or the need for closed user groups could use frame relay, ATM or SMDS. Connectivity speeds, CPE preferences, carrier preferences, geographic locations and pricing considerations would drive the decision. SVCs won't make connectionless services obsolete, although the overlap in target markets and applications will increase for frame relay, SMDS and ATM. Choosing between the goodies in this broadband services smorgasbord simply requires time, which is about as abundant as AFC Super Bowl winners in the past 10 years.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at danny_briere@telechoice.com or christine_heckart@telechoice.com.

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ISDN

Continued from page 21

Stromberg-Carlson "all have slight-ly different ways of talking to CPE," with nearly 40 criteria to choose from, he said.

However, "this is a minor issue, not a showstopper," said Karen FitzGerald, director of business development at Bell Communications Research, a key player in ISDN technology development and standards setting. "Automation is good, but I doubt people who want ISDN would not implement it because they had to enter what is essentially a nine-digit password" to configure their systems, she said.

After 12 years of trying to get ISDN off the ground, equipment makers are scrambling to resolve outstanding interoperability and configuration issues because applications for ISDN's high dial-up rates finally are arriving. In particular, Internet access, which often requires bigger bandwidth than today's analog modems afford, is pushing ISDN into the limelight.

"We're entering the Internet era of ISDN," said David Helfrich, vice president of marketing at 3Com.

But technologies such as cable modems are looming and could steal ISDN's thunder, giving equipment makers incentive to make ISDN, which runs at speeds up to T-1, plug and play, analysts said. In fact, some cable modems delivering 10M bit/sec downstream from the 'Net to the user and 768K bit/sec up-stream are slated for deployment this year.

The new ISDN Forum said it will design an automated ISDN configuration specification by the end of the year. All specifications will be open and licensable free of charge, the forum said.

The ISDN group is the latest in a string of spin-off consortia of the National ISDN Users Forum and the National ISDN Council, which were founded several years ago to solve interoperability issues. Some industry observers said the larger groups, which make decisions by consensus, have moved too slowly and have left too many specs open to interpretation. ■

SNA connectivity

Continued from page 21

mainframe and AS/400 hosts. It also can act as a tn3270 or 5250 terminal emulation server to both environments.

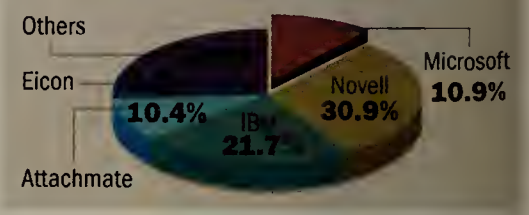
VMC SNA Server will be available Feb. 29. Pricing for a system with an Enterprise Systems Connection and LAN interface begins at $27,000.

Attachmate and Microsoft

Microsoft this week will also announce new software and a relationship with Attachmate Corp. that will boost connectivity options for its SNA Server package.

Attachmate will bundle SNA Server with its Extra terminal-emulation software in a package dubbed The Ultimate SNA Server Starter Pack. It includes SNA Server and five Extra client licenses. The package is available now for $1,339, which is about half the cost of purchasing the components separately.

Microsoft's SNA Server moved into the upper echelon of SNA gateway market share by increasing sales volumes by over 200% in 1995, said researchers at International Data Corp. in Framingham, Mass. The company shipped 15,400 SNA Server units for a 10.9% market share.



Microsoft will roll out its free Service Pack 1 for SNA Server, which includes:

- An interface that lets users link SNA Server with the Microsoft Internet Information Server residing on the same server.
- tn3270E emulation, the latest form of 3270 emulation that lets SNA users access the mainframe over TCP/IP-based nets.
- Support for SNA/SDLC for branch office communications.
- Support for communications between SNA Server and System/3X boxes.
- A Windows 95 client for SNA Server.

✆ Microsoft: (206) 936-3704; Attachmate: (206) 649-6551; Computerm (800) 873-0303.

The gurus have dubbed 1996

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Now that one company offers an entire family of mobility solutions, those gurus are going to look like geniuses.

AT&T

AT&T cuts airtime charges with new PBX extensions

By David Rohde
Basking Ridge, N.J.

AT&T has introduced two new types of wireless PBX extensions that purport to cut out cellular airtime charges when used within an office building or campus environment.

The options, including one that harnesses the unlicensed personal communications services (PCS) spectrum at 1.9 GHz to avoid cellular charges, largely duplicate and even trail competitors' offerings. Analysts said users of AT&T's flagship Definity private branch exchange may want to wait until the AT&T products become available. They also cautioned users to watch implementation costs, which could be a tricky issue.

Along with an enhancement to AT&T's single-zone TransTalk 9000 wireless extension for departments, the new offerings complete what the company is now dubbing the FreeWorks family of wireless solutions.

The multizone unlicensed PCS product, called the AT&T Definity Wireless Business System, is due to ship next fall. The product is similar, though not identical, to the Companion PCS system from Northern Telecom, Inc., introduced to the U.S. market last year. Nortel already has several hundred installations of Companion, said David Yedwab, vice president of Eastern Management Group, a consulting firm in Parsippany, N.J.

For users seeking to use existing cellular telephones, AT&T in the second quarter will offer the AT&T Definity Cellular Business System, which enables in-building and out-of-building mobility with the same Advanced Mobile Phone System cellular handset.

AT&T BROADCASTS NEW WIRELESS OPTIONS

Members of AT&T's FreeWorks family of wireless PBX extensions

Product	Coverage/ Users supported	Price per station
TransTalk 9000 Digital Wireless System	500,000 sq. ft./18	$900
Definity Wireless Business System	4 million sq. ft./260	$1,800
Definity Cellular Business System	Entire service area/512	$1,800

The TransTalk 9000 is an enhancement of the existing offering, which supported fewer simultaneous users.

GRAPHIC BY TERRI MITCHELL SOURCE: AT&T, BASKING RIDGE, N.J.

Management vendors target switched networks, Internets

By Jim Duffy

Three network management vendors last week unveiled products and strategies to help users get a grip on some of the newer technologies going into their networks.

Frontier Software Development, Inc. rolled out an architecture for adding Remote Monitoring (RMON) capabilities to switched networks, while NetSys Technologies, Inc. unwrapped performance monitoring tools that work with routed and switched environments.

Novadigm, Inc., meanwhile, disclosed an initiative for developing products that manage software configurations across the Internet and intranets.

To support Unison, Frontier rolled out several new products. NetScout Roving RMON Probe is available for $2,995 to $3,995.

Also available now is Scout Enterprise Probe Model 7200 for Fast Ethernet, which costs between $6,995 and $13,495. NetScout Manager Plus with Switch Monitor, a software application, will be available in March at prices ranging from $5,995 to $8,995.

Frontier's products also can be used to feed information to NetSys' Enterprise/Solver Performance Tools, which include two packages: Performance Baseliner and Performance Solver.

Management mix

Company/Products	Features
Frontier Software/ Unison architecture; NetScout Fast Ethernet Probe; NetScout Manager Plus with Switch Monitor	Strategy and product line for monitoring high-speed switched networks using RMON
Novadigm/EDM	Manages software configurations on systems connected to the enterprise through the Internet
NetSys/Enterprise/Solver Performance Tools	Allow network managers to plan and implement changes in routed networks and solve day-to-day operational performance problems

Performance Baseliner provides a performance "snapshot" of the current network to indicate areas of high-traffic volume and potential trouble. Performance Solver can use this data to evaluate network performance and conduct what-if scenarios to assess the impact of changes and explore possible fixes to performance problems.

Performance Tools cost $10,000 and will be available for router networks in February. Versions for switched networks will be available in the second and third quarters.

Frontier's Unison architecture defines where to implement RMON for an enterprisewide view of network traffic. Here's what Unison recommends:

- Purchase switches that embed four of the nine RMON groups — statistics, history, alarms and events — in silicon at each port.
- Deploy roving probes that support seven-layer monitoring.
- Instrument high-speed interswitch links with dedicated probes.
- Aggregate data from embedded, roving and dedicated probes into a consolidated view of switch traffic.

"It combines the best of the built-in monitoring with the capabilities of an external agent," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

Should switching users need to conduct business over the Internet, Novadigm plans to address their software management needs. The company's broad product development initiative includes enhancements to Novadigm's flagship Enterprise Desktop Manager (EDM) product line, which automatically deploys and manages changes to client/server software across the enterprise. Among other things, the enhancements will enable the deployment, presentation, building, linking and version control of Internet services via EDM.

Products will be rolled out this year.

✆Frontier: (800) 357-7666; NetSys: (415) 833-7500; Novadigm: (201) 512-1000.

In-building calling should not hit the public cellular network because the cellular handset will register itself with an in-building base station and take its commands from the PBX, said Barry Weinbaum, director of wireless and mobility solutions for AT&T Global Business Communications Systems.

But each user company will have to negotiate a flat monthly charge with the cellular provider, Yedwab noted. He guessed that such a charge would run $30 to $50 per handset.

Several handset manufacturers have worked out similar arrangements with cellular carriers, notably Southwestern Bell Mobile Systems.

Another cost consideration, Weinbaum said, is the design of the building itself. Construction materials and other factors can block radio frequency (RF) and cause an in-building call to be captured by an outside tower. But in most such cases, the PBX dialing scheme does not work, alerting the caller that the call was captured by the public network.

To help users identify potential RF problems in advance, AT&T officials said its Bell Laboratories unit has developed a computer-aided design tool for use with FreeWorks. Such a tool is needed to assuage users' fears of quality problems and hidden costs in wireless implementations, Yedwab said.

"The whole concept of RF engineering is somewhat foreign to the PBX world," he said.■

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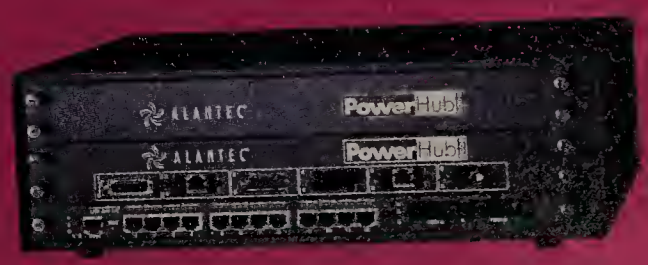

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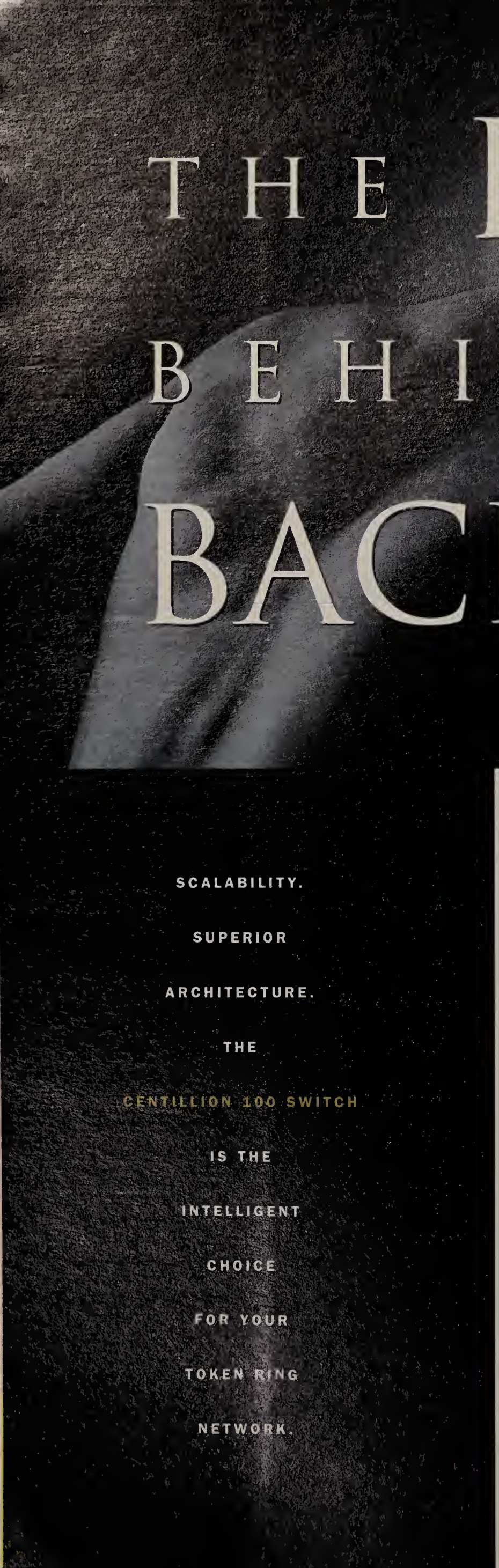

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Briefs

■ **UB Networks, Inc.** *will unveil this week at ComNet '96 in Washington, D.C. an* **Ethernet switching module** *for its GeoLAN/500 high-end switching hub. The Port Mobile Ethernet Concentrator (PMEC) is a 24-port module that lets users create virtual LANs at the port level. The GeoLAN/500 supports up to 11 PMEC modules providing as many as 264 Ethernet ports. It costs $3,995 and is available now.*

UB: (408) 496-0111.

■ **Whitetree Network Technologies, Inc.,** *a workgroup Asynchronous Transfer Mode switch vendor based in Palo Alto, Calif., last week announced* **LAN Emulation** *software for its 12-port Ethernet-to-ATM switch. The software, available now, is included in the price of the switch, which starts at $7,795.*

Whitetree: (415) 855-0855.

■ **RDC Networks, Inc.,** *a* **wireless LAN** *vendor based in Foster City, Calif., last week rolled out a new spread-spectrum radio device that includes net management software. The PortLAN system offers PC interfaces, access points and Simple Network Management Protocol management software. The PC card costs $695, the access point starts at $1,895, and the management software costs $495. All three are available now.*

RDC Networks: (415) 577-8075.

Moving up the LAN switching ladder

Basic LAN switches are great for boosting network performance, but their multiprotocol descendants are even better.

By David Axner

First came plain old LAN switches, then multilayer versions. Now come multiprotocol releases.

Multiprotocol switches expand on the capabilities of their multilayer predecessors, which switch data at Layer 2 and route one protocol at Layer 3. The latest switches typically handle Apple Computer, Inc.'s AppleTalk, Digital Equipment Corp.'s DECnet, IP and Novell, Inc.'s IPX. Some even include support for Banyan Systems, Inc.'s VINES and other less popular protocols.

Multiprotocol switches provide total flexibility in configuring intelligent networks.

In general, intelligence can be implemented just in the backbone or distributed across the network.

With basic LAN switches, intelligence stays in the core network. Workgroup and departmental LANs are constructed as flat networks using Layer 2 switching. This eliminates the cost of adding intelligence to departmental and workgroup LANs at the expense of making these levels inflexible.

Get down to the Ethernet switching basics on Network World Fusion (http://www.nwfusion.com). From the main menu, select Technology Resources then LAN/Network operating systems.

The basic LAN switch

The market for LAN switches destined for workgroups and departments has skyrocketed. These basic switches conform to the Open Systems Interconnection Layer 2 protocol and operate as fast bridges, meaning they are transparent to network layer protocols.

The switches typically use Application Specific Integrated Circuits (ASIC) and move packets according to their media access control (MAC) destination address.

The advantages of Layer 2 switches lie in speed and cost. Because switching is in silicon, performance is at wire speed.

Cost is minimized by sacrificing the intelligence needed to route packets. But the ASIC design makes these switches inflexible to change, so the money saved buying them will be spent on reconfiguring and administering them.

Layer 2 switches can improve performance by dividing LANs into smaller segments and by providing dedicated connections between workstations and switch ports for high-power users. But as these flat networks scale upward, the volume of broadcast traffic increases and network congestion and performance degradation results.

With multilayer switches, intelligence can be distributed

See **LAN switches,** *page 4L*

Novell's Web partner readies second-generation server

By Kevin Fogarty

Bedford, Mass.

The company that gave Novell, Inc. its entrance to the World-Wide Web market believes the future of the Web involves Destiny and a Wrench.

The American Internet Co. (AIC) saved the day for Novell by licensing its Web server to the networking giant, which was desperate to remedy the lack of Web servers that supported either NetWare or IPX networks (see story, page 6L).

AIC *President and CEO Throop Wilder*

Now AIC is expanding its horizons. The idea is to make its Web server a user-friendly front end for applications that use back-end servers and databases for processing — a concept the company's president calls "sleazy clustering."

The company's new products include an intranet package code-named Destiny and a module code-named Wrench that will bolt the Web server to Oracle Corp. databases, according to Throop Wilder, AIC's president and chief executive officer.

Destiny is based on the firm's existing SiteBuilder server for NetWare environments. But unlike SiteBuilder, Destiny also will run under Microsoft Corp. Windows NT Server.

The key aim is flexibility. AIC's goal is to let customers build applications that look like

See **AIC,** *page 5L*

ATM vendor makes U.S. debut

By Jodi Cohen

San Jose, Calif.

Thomson-CSF Communications Enterprise Networks division entered the U.S. market last week with the announcement of several ATM and switched LAN products.

The products center around the Thomflex 5100 ATM backbone switch, a modular four-slot chassis that can support as many as 16 155M bit/sec Asynchronous Transfer Mode connections or 96 25M bit/sec links and boasts a switching capacity of 2.8G bit/sec.

The box supports 2,048 virtual circuits per port and 4,000 media access control addresses per switch.

Other features include virtual LAN support as well as internal routing capabilities for virtual LAN interconnections. It can be managed by Simple Network Management Protocol-compliant platforms.

In addition to the backbone switch, Thomson-CSF announced 25M, 155M and 622M bit/sec ATM interface cards for servers and workstations.

Thomson-CSF will complement the ATM gear with Ethernet and token-ring switching devices through an OEM agreement with a company that has not yet been determined, according to Olivier Gibergues, marketing manager at Thomson-CSF. The LAN switches will be used to attach workstations to an ATM backbone.

He added that Thomson-CSF plans to offer ATM access switches, which will be internally developed.

Although Thomson-CSF is new to the U.S. market, the vendor's parent company has had 10 years of experience installing ATM nets in France.

But Mark Leary, director of LANs at International Data Corp., a consulting firm in Framingham, Mass., said Thomson-CSF will probably have trouble competing with ATM heavyweights 3Com Corp., Bay Networks, Inc., Cisco Systems, Inc., Fore Systems, Inc. and IBM.

Subsidiary of: Thomson-CSF, France
Based: San Jose, Calif.
Founded: Jan. 1
Employees: 4,900
Primary products: LAN backbone and workgroup ATM switches

"Thomson is certainly at a competitive disadvantage from the standpoint that they are not working from an installed base of routers or low-end switches," he said.

Leary said that although Thomson-CSF's ATM box seems solid as far as performance and features, he said it lacks any significant differentiators that would encourage users to take a chance with a new vendor.

Pricing for the Thomflex 5100 ATM backbone switch starts at $32,800 and will be available in May. Pricing and availability for the other products has not been determined.

✆ Thomson-CSF: (408) 452-8585.

Boot ROMs deliver desktop control

By Lenny Liebmann

While LAN utility vendors eagerly proffer software-based solutions for desktop management, many network administrators are quietly building manageability into their PCs with inexpensive — and decidedly unglamorous — boot read-only memory chips.

These firmware-equipped chips are installed on a computer's network interface card (NIC). When the PC is turned on, the boot ROM directs it to load from a set of configuration files located on the network file server. This simple shift of boot files from the user's local hard drive to the file server can significantly increase the efficiency with which net managers support and administer desktop clients.

By removing boot files from local hard drives, net managers can prevent end users from inadvertently altering those files. Desktop operating systems being what they are, many users have unwittingly changed their boot files while adjusting their setups. The resulting boot problem may not surface until the next time they start their PC.

Booting problems, which represent a significant portion of total support calls, can be particularly time-consuming because the failure to boot properly often results in an inability to attach to the network.

This means support staffers cannot use their help desk utilities to diagnose or remedy the problem over the LAN. Instead, they have to sit at the user's PC and go through a handful of diskettes.

Easier configuration to boot

In addition to preventing users from disturbing boot files, centralized booting makes it much easier for administrators to manage and update boot configurations. Rather than having to copy files out to hundreds of individual desktops, administrators can make changes at a single point.

This can slash hours from the time required to update a driver, install a new DOS version or modify a communications parameter, for example.

What's more, centralized boot management eliminates all the network traffic created by massive network distributions. And, because all changes are executed on the file server, modifications of boot files can be executed when PCs are in use or turned off.

"I can go in and change frame types for 30 workstations with just one edit," said Kylo Ginsberg, a network administrator at the University of North Carolina in Chapel Hill.

Streamlined boot management is a double blessing to network administrators: First, it cuts the time and effort needed to execute the types of modifications they always have made. Second, because centralized boot management makes updating files so much easier, administrators now can choose to make incremental modifications that they previously would have avoided.

Such system tweaks can often optimize workstation performance or resolve chronic, but relatively minor, problems.

Boot ROMs can help manage diversity, as well. Multiple boot images can be stored on the server, allowing administrators to create a controlled range of boot configuration options. In addition, multiple boot images on the server can provide a safety net during migrations.

For example, a server can house new and older versions of a boot image. When it comes time for the upgrade, users' boot ROMs are directed to read the newer image. If a problem arises, users can be redirected to the previous working version. This can eliminate the panic-stricken deinstallation and reinstallation of files over the network that characterizes most upgrade rollbacks.

Another benefit of storing boot files on the file server is that they get saved as part of the routine server backup process. Boot configurations can easily be missed by typical backup procedures when they reside on individual hard drives.

When contingencies occur and configurations have to be restored, it is difficult to give users their original boot image. With boot ROMs, once the server is restored, users can connect to their corresponding boot configuration.

The booty

In early LAN days, boot ROMs were most commonly used in diskless workstations: With a boot ROM installed on the NIC, these machines could boot from server-resident files. This cut the per-seat capital outlay for installations, reduced administration costs and eased security concerns.

Even in PCs with hard disks, boot ROMs can simplify installation since they eliminate the need to configure desktops individually.

"Boot ROMs make it easier to install PCs," said Daniel Yu, system support specialist at Hofstra University in Hempstead, N.Y. "When we install a new machine, pop in the network card with the boot ROM and assign it an image, it's connected. There's no need to configure the PC at all."

One of the more recent innovations in the boot ROM market has been the addition of antivirus firmware, such as McAfee's ROMshield, to the chip. This provides protection against boot sector viruses, which can be particularly threatening to a network because they can cause damage before conventional antivirus software is activated.

Even without such firmware, boot ROMs protect desktop PCs from boot sector viruses introduced via local floppy drives because the PC's boot sector remains dormant.

Many NIC vendors, including Intel Corp. and 3Com Corp., offer network adapters that are equipped with boot ROMs. Most of them actually get their chips from Lanworks Technologies, Inc., a small Toronto-based company that pioneered the boot ROM concept.

"Frontline LAN managers can all tell you about the importance of maintaining boot file integrity," said George Kostiuk, president of Lanworks. "It's absolutely fundamental to the health of any client/server computing environment."

Kostiuk observed that most network managers take a top-down approach to desktop administration instead of looking at the benefits of building manageability right into their PCs through the installation of boot ROMs.

"Many managers who have pinned all their hopes on what they can do from the central command console are seeing the limitations of solutions that are entirely based on administrative software," Kostiuk said. "As the ratio of PCs to administrators continues to grow, more [managers] will wake up to the practicality of putting a firmware agent on the interface card."

Liebmann is a writer and consultant who specializes in microcomputer networks. He can be reached at lliebmann@mcimail.com.

Booting benefits

Shifting boot files from local hard drives to a network file server is a simple, inexpensive way to gain control of the desktop environment. Here are some benefits of centralizing files:

- **Prevents** users from inadvertently changing their boot configurations.
- **Makes** it possible to establish a controlled range of boot configuration options.
- **Allows** boot configuration changes at a single point rather than at every desktop.
- **Eliminates** traffic due to massive network distributions.
- **Enables** configuration modifications while PCs are in use or off.
- **Makes** it easy to restore a user's original boot image if the network crashes.

Hitting the road with mobile software

Company	Product	Price per package
Digital, Maynard, Mass. (Contact local sales rep)	Mobilizer for Windows	$299
MobileWare, Dallas (214) 952-1200	MobileWare	$1,400 for server software and five clients
Oracle, Redwood Shores, Calif. (415) 506-7000	Oracle Mobile Agents	$99
Relay Technology, Vienna, Va. (703) 506-0500	Relay/Anyplace	$199
Xcellenet, Atlanta (404) 804-8100	RemoteWare	$50-$500, depending on operating system

Software makes mobile communications even easier

By Paul Korzeniowski

Computer users working at their desktops can easily access needed applications and data by entering a few simple commands, so many find an unpleasant surprise when they boot up their laptops and connect to the corporate LAN while on the road.

Client/server applications generally are not designed to run over remote connections, particularly if those links are wireless. Consequently, mobile users cannot access LAN-based data while away from the office as easily as they can at their desks. They must undertake the difficult chore of tailoring communications software to work with complex network protocols.

A number of vendors — including Digital Equipment Corp., MobileWare Corp., Oracle Corp., Relay Technology, Inc. and Xcellenet, Inc. — have developed remote communications packages to ease this process and to make networking over wide-area wireless links more viable.

The software typically has robust security features to ensure unauthorized users are not connected to the network. It also has compression features that help users squeeze data designed to flow over 10M bit/sec Ethernet networks onto connections that run at speeds as low as 4.8K bit/sec. It also synchronizes local data and data stored on remote servers, and offers two-way communication features that notify traveling users of pending messages.

Going places

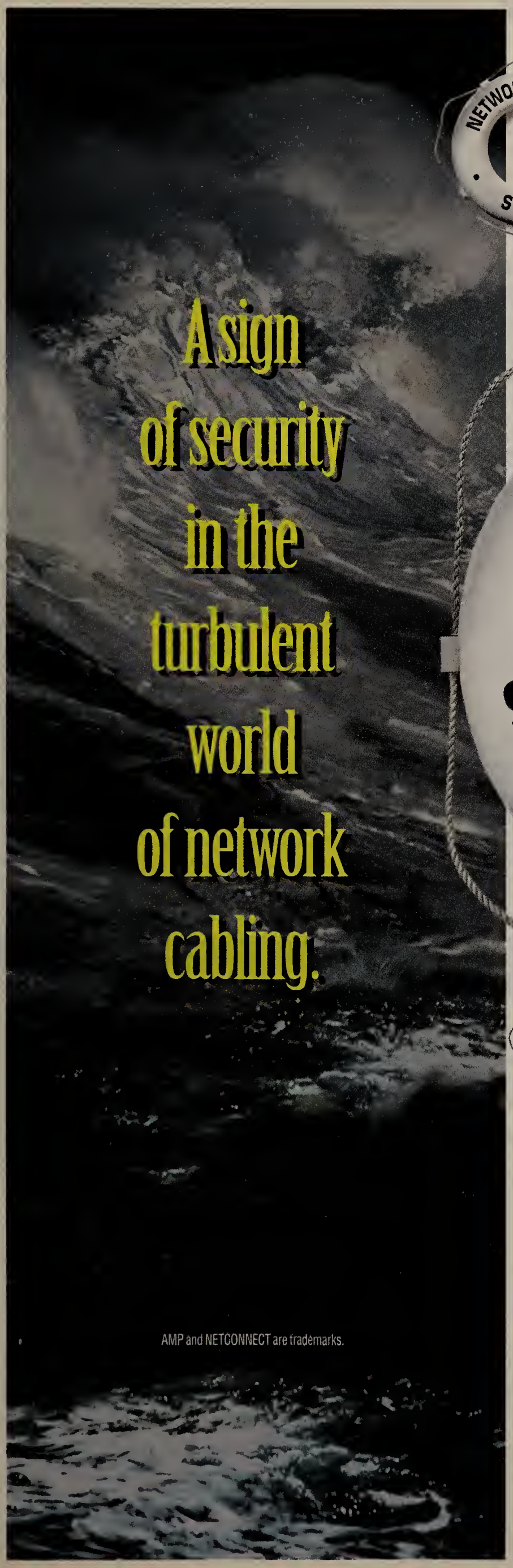
The above-mentioned vendors are building product suites with a variety of programming tools and encouraging third parties to design turnkey applications, such as sales force automation packages.

"The market for wireless communications packages is just beginning to emerge," said Dan Merriman, director of mobile and wireless communications at BIS Strategic Decisions, a Norwell, Mass., market research firm.

The untapped market enticed Relay Technology, a 14-year-old company that last year acquired WildSoft, Inc. It incorporated that company's mobile communications package into its Relay/Anyplace software.

Amcom Business Centers Corp., a computer reseller in

See **Remote,** *page 9L*



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LAN switches

Continued from page 1L

With multilayer switches, intelligence can be distributed from the network core to the desktop. This is because they support Layer 2 switching and Layer 3 routing. This approach, while more expensive than basic LAN switching, provides considerably more configuration flexibility. Designers can build networks that bridge packets where applicable and route packets where necessary.

The viability of multilayer switches depends on the protocol supported. For example, if a multilayer switch supports IP, then IPX packets can only be switched at Layer 2, not routed at Layer 3. Multiprotocol switches are intended to eliminate this limitation.

For added flexibility, multilayer and multiprotocol switches support logical workgroups or virtual LANs across a network. This means network managers can create networks based on logical groupings independent of physical connections. Layer 2 switches can support virtual LANs but only on a switch port or packet MAC address basis.

With the Layer 2 VLAN approach, users can set up broadcast domains and define filters to control access. Layer 2 VLANs also can overlap so users can belong to two groups where required. However, VLANs can only be connected by routing. Without Layer 3 support, external routers must be used in conjunction with Layer 2 switches to interconnect VLANs.

Multilayer and multiprotocol switches provide other benefits, including improved network security, and the ability to segment networks and establish firewalls to prevent the proliferation of broadcast packets.

Beyond IP

Multiprotocol switches are available from a growing number of vendors. Foremost among these is Alantec Corp., which in 1991 pioneered the combination of Layer 2 switching and Layer 3 routing in its original PowerHub. It now includes Layer 2 switching with Layer 3 routing in each of its three LAN switches: the PowerHub 7000 for backbone networks, the PowerHub 6000 for departmental LANs and the PowerHub 4000 for workgroups.

With software released last fall, the switches route AppleTalk, IP, IP Multicast and IPX packets. Alantec also differentiates itself by processing packets via software rather than hardware. This allows the company to add features, update protocols and correct errors via a simple software download at the user site. It doesn't have to mess with the effort and cost of reengineering ASICs. PowerHub users with small networks can establish VLANs via port assignments. However, port-based VLANs are switched only and limited to a single hub. To accommodate users who need to belong to more than one workgroup, the VLANs can be overlapped.

For more complex networks, VLANs can be established via the routing protocols available in the PowerHub software. Users can assign multiple subnets per switch port or multiple ports per subnet. This technique allows VLANs to be established across multiple hubs connected to the same backbone and lets different VLANs be internetworked.

For increased flexibility, Alantec plans to support VLANs defined by MAC addressing. This will come next quarter.

In addition to Alantec, which Fore Systems, Inc. acquired late last year, Cabletron Systems, Inc., Cisco Systems, Inc., 3Com Corp. and Xylan Corp. offer multiprotocol switches. Surprisingly, Bay Networks, Inc. does not have a Layer 2 switch with Layer 3 routing.

Cabletron, located in Rochester, N.H., routes AppleTalk, DECnet, IP and IPX traffic through its multiprotocol, RISC-based switching modules for the Multi Media Access Center and MMAC-Plus hubs. It is beta-testing support for IBM's Advanced Peer-to-Peer Networking and Banyan's VINES protocol with an aim for release by midyear.

The company uses a connection-oriented, policy-based switching scheme, called SecureFast Virtual Networking (SFVN), that relies on an external route server to set up connections between call origin and destination. SFVN then switches packets over the established path to maximize performance.

Cabletron also supports this scheme using the same routing protocols in the ESX-1320, a 12-port, stand-alone Ethernet workgroup switch, and the MMAC ESXMIM, a six-port Ethernet switching module for the MMAC.

Cabletron also provides multiprotocol support through the EliteSwitch ES/1 and ES/1 ATX switches it obtained through the acquisition last fall of Standard Microsystems Corp.'s (SMC) enterprise nets business unit. Routable protocols are AppleTalk, IP, IP Multicast and IPX.

Hauppauge, N.Y.-based SMC provides Layer 2 switching in its TigerSwitch XE and LXE models, but it is unclear whether Cabletron will add Layer 3 routing to them.

Cisco, located in San Jose, Calif., brought intelligence to the workgroup level with its Catalyst 1200, which supports Layer 2 switching and IP and IP Multicast routing. It plans to introduce in mid-1996 Layer 3 multiprotocol support at the departmental level with its Catalyst 5000.

The Catalyst switches let users set up VLANs on a port, a MAC or an IP address basis. Port-assigned VLANs can span multiple switches attached to a common FDDI backbone via an FDDI concentrator.

Cisco implements this by tagging MAC frames with the appropriate VLAN information. VLANs assigned to IP addresses support one subnet per port or multiple ports per subnet.

3Com of Santa Clara, Calif., supports Layer 3 routing at the backbone and departmental levels via its LANplex 6000 and 2500 switches, respectively. These switches support AppleTalk, IP intranetwork routing with Routing Information Protocol, and IPX. User-configured IP routing supports multiple switched segments per subnet and multiple subnets per port. Ethernet switching is used within subnets, and intranetwork routing is used between subnets to optimize throughput.

Users can construct VLANs by port, MAC address or by using IP subnets.

Xylan, a 2-year-old start-up based in Calabasas, Calif., provides a modular switch that can be used for workgroups and departments, or as a collapsed backbone in a data center. The OmniSwitch, which combines Layer 2 switching and Layer 3 routing, supports IP and IPX. AppleTalk will be available later this year.

As they can with 3Com switches, users can create VLANs by port assignments, MAC or network addressing.

All of these products give users the flexibility they need to respond to changes in their business environment because they switch data and route any number of protocols. What's more, they provide the intelligence needed to create networkwide VLANs. And because they can be upgraded with software revisions for improved capabilities, they provide investment protection and a prolonged life.

Axner is president of DAX Associates, an internetworking consultancy based in Oreland, Pa. He can be reached at (215) 886-1820.

Narrowing the choices

When sorting through the multiprotocol switch offerings, keep in mind these guidelines:

- Must be able to support multiple mainstream network protocols, including AppleTalk, DECnet, IP and IPX.
- Should allow the establishment of VLANs.
- Should provide switching performance comparable to Layer 2 switches.
- Should provide configuration flexibility and scalability.
- Should be capable of supporting emerging technologies, such as ATM and fast Ethernet.

Multiprotocol support and much more

Vendor/ Model	Switch type	LAN ports	High-speed ports	Filtering/forwarding rates (In K packet/sec)	Routed protocols	Virtual LAN support	Price per port
Alantec/ PowerHub 7000	Modular, with 5, 10, 15 or 20 slots	240 or 456 Ethernet	48 fiber, 128 UTP FDDI	14.8/800	AppleTalk, DECnet, IP, IPX	256 per protocol	$390
Alantec/ PowerHub 6000	Modular, with 3 slots	From 12 to 60 Ethernet	1 FDDI or 100Base-T	14.8/140	AppleTalk, DECnet, IP, IPX	256 per protocol	$498
Alantec/ PowerHub 4000	Stand-alone	12 Ethernet	1 DAS FDDI or 2 100Base-T	14.8/140	AppleTalk, DECnet, IP, IPX	256 per protocol	$579, plus $750 for fast Ethernet or $3,000 for FDDI
Cabletron/ MMAC Plus	Modular, with 14 slots	336 Ethernet; 336 token-ring	112 fiber, 168 UTP FDDI; 14 OC-3 multimode fiber ATM	14.8/400 per switch; 14.8/5,000 per hub	AppleTalk, DECnet, IP, IPX	Virtually unlimited	From $500 to $600
Cisco/ Catalyst 1200	Stackable via FDDI concentrator	8 Ethernet	1 fiber or UTP DAS FDDI	14.8/118.4	IP, IP Multicast	1,020	$800 or $1,000
SMC/EliteSwitch ES/1 ATX	Modular, with 5 slots	From 4 to 20 or 8 to 40 Ethernet; from 4 to 20 token-ring	From 1 to 5 DAS or SAS FDDI; from 1 to 5 HSSI	14.8/296 switching/routing	AppleTalk, IP, IP Multicast, IPX	From 100 to 200	$247 for 4-port Ethernet card; $186 for 8-port Ethernet card; $622 for token-ring
3Com/ LANplex 2500	Modular, with 4 slots	8 or 16 Ethernet	2 DAS or 4 SAS FDDI/CDDI	14.8/565 switching; 14.8/115 routing	AppleTalk, IP, IPX	256	$350 for Ethernet; $725 for fiber Ethernet; $2,700 for CDDI; $11,000 for FDDI
3Com/ LANplex 6000	Modular, with 4 or 12 slots	From 16 to 176 Ethernet; from 8 to 88 token-ring	22 SAS FDDI	14.8/565 switching; 14.8/115 routing	AppleTalk, IP, IPX	256	From $18,000 to $20,000 per Ethernet/FDDI module; $1,688 for token-ring
Xylan/ OmniSwitch	Modular, with 5 or 9 slots	32 or 64 Ethernet; 24 or 48 token-ring	8 FDDI/CDDI; 2 OC-3 ATM	14.8/400 switching; 14.8/40 routing	IP, IPX	65,000	$619 for Ethernet; $1,475 for token-ring

DAS = Dual-attach station CDDI = Copper Distributed Data Interface HSSI = High Speed Serial Interface SAS = Single-attach station

AIC

Continued from page 1L

ordinary Web pages but can launch processes on legacy databases, making the resources of an entire network accessible from a Web browser.

For example, applications running on the Web server could launch processes that generate preconfigured reports using current data from several back-end databases. Another application could process orders from outside, protecting the data with Netscape Communications Corp.'s Secure Sockets Layer (SSL) encryption scheme.

To help integrate applications, the stand-alone version of SiteBuilder and Destiny will pass calls to other servers using SiteBuilder's Remote Common Gateway Interface.

AIC's goal is to let customers build applications that look like ordinary Web pages but can make the resources of an entire network accessible from a Web browser.

Destiny will include features common in IP Web servers but lacking in the NetWare IPX world, such as:

- The SiteBuilder Web server;
- A mail server that supports Simple Mail Transfer Protocol, Post Office Protocol and Internet Message Access Protocol;
- A Domain Name Server;
- A File Transfer Protocol server.

"We're trying to fill in the empty pieces of the intranet," said David Kaufman, product manager for SiteBuilder. "Most Web servers are just designed for publishing."

Web servers, especially those designed for NetWare IPX networks, lack features such as Destiny's that help end users find multiple internal Web sites, retrieve documents such as insurance forms or corporate policy statements and communicate via electronic mail, all from the same browser, Kaufman said.

In addition, AIC plans a set of authoring tools designed to ease the task of building server-based applications accessible from the Web server.

They include:

- SiteBuilder Plus, a repackaged version of FrontPage the Web page-authoring tool from Cambridge, Mass.-based Vermeer Technologies, Inc. that will work with Destiny. It will ship in March.
- Wrench, a database access tool that will link SiteBuilder to Oracle databases. It is due in April.
- A repackaged version of ManageWare from Phoenix-based HiTecSoft Corp., a tool that makes building NetWare Loadable Modules (NLM) easier.

ManageWare will help AIC customers build custom NLMs to run with their Web sites, Wilder said.

Around midsummer, the company plans a commerce-ready version of SiteBuilder that supports SSL security and includes a set of extensions to SiteBuilder Plus that will allow applications written in C, C++ and Basic to run on the server and access back-end services, said Andy Sudduth, senior software engineer at AIC.

Java support will come from a core set of APIs that will eventually support other languages, most likely including Java, PERL and Visual Basic.

That would let information systems departments custom design applications with their favorite tool, using the Web as a front end.

"You need to use the right tool for the right job," Sudduth said. "We're basically trying to make it language-neutral."

FrontPage and the other tools will make building Web pages and linking them to custom-designed applications, including NLMs, simpler, Kaufman said. ■

MORE ON-LINE

See what other Web servers are available for NetWare environments. Link to http://www.nwfusion.com. Select News+ then Local Networks.

NetworkWorld Fusion

Novell moves ahead of the pack with the release of NetWare Web Server

By Mark Gibbs

It may have appeared so for a while, but with the release of NetWare Web Server late last year, it became clear that Novell, Inc. doesn't plan on letting other vendors pass it by in the race for the World-Wide Web market.

NetWare Web Server, which is for NetWare 4.X users, is based on the httpd created by the National Center for Supercomputing Applications (NCSA). It appears to be a robust and stable product — perhaps because porting the NCSA httpd should have been reasonably straightforward given NetWare's Unix roots.

Getting started

Per usual, Novell offers the product and its main documentation on CD-ROM. But with the Web server, the company has done away with its usual turgid and tedious documentation. In its place is the Quick Start Card, which briefly explains how to install the product via the NetWare server console Install utility.

Unfortunately, a lot of detail just isn't available since there is no documentation. For example, at the end of the installation, there are rather arcane explanations on how to configure name resolution. This detail should and could have been handled by the product.

It also should handle the procedure for configuring packet receive buffers. Novell advises in the README.TXT file on the distribution disk that users should set "maximum packet receive buffers=1000" at the NetWare file server. This instruction could easily be missed since the file is only optionally displayed at installation.

SERVING UP THE WEB

Product profile: NetWare Web Server
Vendor: Novell
Platform: NetWare 4.X
Price: $995 per server
Synopsis: This is a well-featured product that is easy to install, offers good performance and has a decent management interface. On the other hand, it suffers from weak documentation, poor server-use reporting and far too few examples of back-end scripting.

The Web server will automatically install itself to take advantage of the multiprocessor environment if it is being used with the symmetric multiprocessing release of NetWare. Whether used with that version or the single-processor one, it is compatible with NetWare System Fault Tolerance III.

The next step

NetWare Web Server requires a Microsoft Corp. Windows 3.X or Windows 95 workstation.

The configuration utility, called Webmgr, is easy to use but, oddly, requires access to the Web server's root subdirectory — by default SYS:\WEB — on the target NetWare server. In what probably was a shortcut in development, Novell decided that the configuration data should be stored as files in the disk system and modified via file access.

I expected the configuration data to be stored as objects in the NetWare Directory Services (NDS) tree — after all, NetWare Web Server is only for NetWare 4.X. But after installation, the NDS tree shows no entry for anything to do with the Web server. The only use the product appears to make of NDS is for finding user home directories for private document publishing.

After selecting the target server, you can set or modify the Web server configuration. First, you must specify the server's fully qualified domain name or IP address. Don't expect much help — the Quick Start Card is utterly confusing on this point.

You also need to specify other parameters, including what TCP/IP port to use;

the administrator's electronic mail address, which is displayed in certain error messages; the default document subdirectory; the location for log files and if user documents in home subdirectories can be retrieved.

Fancier configuration options

More advanced configuration options include the ability to select whether directory indexing should be enabled. (All good Web servers offer this handy facility.) If it is selected and a path is requested without a target file as part of a client request, the server returns a directory listing for subdirectories that don't contain the default index files. In effect, this makes such subdirectories the equivalent of file archives.

Novell also lets you enforce access control for systems by their IP address or domain name and for user accounts defined in the NDS system.

The final configuration options concern log file handling. You can set a maximum disk space use for all log files and any individual log file, and decide whether the logs will be rolled over — Novell's term for deleting the oldest log file, renaming all previous files and then creating a new log file. You also can make a debug log, but without any documentation on the messages in the log, it is useless.

Novell's *Web Server provides users help in creating home pages.*

The Webmgr utility lets you browse the debug, access and error logs. The access file is certainly the most useful of the three, particularly if you have a public server, but Novell hasn't provided any analysis tools yet.

Other Webmgr functions include the ability to restart, pause and continue Web server. At installation, you set an administration password for each server and that password is validated for all server reconfigurations and control operations.

Beyond the basics

Obviously, a Web server that can't run back-end applications is far less useful than one that can. To address this in terms of the unique NetWare environment, Novell has created its own version of the Common Gateway Interface. CGI is the standard API used to pass messages between Web servers and back-end applications.

Novell's solution, called Remote CGI, uses TCP/IP sockets for communications between the server and the application. This means requests to run a back-end application can be directed from the NetWare Web Server to another server via standard TCP/IP services. Novell specifically provides a variety of daemons so that existing back-end scripts implemented under Unix can be used with NetWare Web Server.

NetWare Loadable Modules (NLM) can be used as back-end servers. Since programming for Web servers is often done in PERL, Novell has implemented a PERL interpreter as an NLM. And for users who want a really simple programming system, Novell includes a BASIC interpreter NLM.

I wasn't impressed with the few example back-end applications provided in the product. This is a shame because there is tremendous potential for easily programmed server-based applications under NetWare that are accessible via the Web server.

Processes that would allow NetWare servers and NDS to be managed via a Web interface would be a slam dunk, for example.

NetWare Web Server may have some deficiencies and a few holes, but it is efficient, reliable and well priced. Compared with other vendors' NetWare-based Web servers, Novell's own is much more fully featured.

Gibbs is a consultant and writer based in Ventura, Calif. He can be reached via the Internet at mgibbs@gibbs.com or by phone at (805) 644-4999.

WINDOWS

Dave Kearns

Deciding how to print using Win95

Many NetWare administrators upgrading workstations to Windows 95 are facing a decision about printing. Specifically, after spending hours configuring a Windows 3.X workstation to act as a remote print server that uses either NetWare 3's RPRINTER or NetWare 4's NPRINTER, they want to achieve the same functionality using Windows 95.

You can continue to run RPRINTER or NPRINTER with Windows 95, but you will also need to run Novell's real-mode client software — the NETX shell, or VLM DOS redirector. This can significantly reduce Win95's functionality.

Included with Windows 95 is a network function called File and Print Services for NetWare. This allows any Windows 95 workstation using one of the two Microsoft Clients for NetWare to share its file system and locally attached printer with any other node on the NetWare network.

But the Windows 95 machine imitates a standard NetWare (3.X variety) file server. This means it sends out Service Advertising Protocol (SAP) packets every minute, identifying itself as a NetWare server.

Worse, it blithely responds to workstations' "Get nearest server" requests, which the workstation sends when it's first booted, as if it were a real server. When users try to log in, all that will come back is a "No response from server" message. The result is lots of support calls.

Microsoft's response when this was first pointed out was to create a directory structure called \NWSYSVOL\LOGIN\ under the Windows 95 directory (typically C:\WINDOWS) and what it called a "login stub," a program called LOGIN.EXE.

This program will emulate NetWare's LOGIN.EXE if you specify a server name on the command line — for example, LOGIN SERVER1/. If you don't specify a server name, it will attempt to log the user in to a default server, which must be configured in Windows 95.

This real server must have an account called WINDOWS—PASSTHRU (in the bindery context if this is a NetWare 4 server) with no password and read access to the bindery. This will log the user in to the real NetWare server by passing the user name and password information to it for authentication. Of course, if I were a problem user, it wouldn't take me long to figure out that this is an excellent way to capture user passwords.

SAP-ped nets

The second major problem with Windows 95 File and Print Services for NetWare involves SAP packets.

SAP packets sent every minute can quickly consume bandwidth. Novell responded to this by releasing the NetWare Link State Protocol as a way for servers to efficiently communicate.

Imagine a few hundred Windows 95 machines on your net advertising themselves as NetWare servers with a SAP every minute. Under 20 Windows 95 machines have been known to bring down a large, campuswide internetwork in minutes.

The new version of NPRINTER for Novell's Client32 for Windows 95 — expected in February — should solve most of these problems. But for now, given the two problems outlined above, the suggestion here is to stay with real-mode clients and the current versions of RPRINTER and NPRINTER.

Correction: In my Jan. 15 column, I called the Windows 95 Resource Kit help file W95RK.HLP, which is incorrect. The file is available on the Windows 95 CD as \admin\reskit\helpfile\win95rk.hlp.

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Remote

Continued from page 2L

West Chester, Pa., began working with the WildSoft package in 1994. It has concentrated on the mobile market to differentiate its computer offerings from competitors, said Thomas Vetterani, president and chief executive officer at Amcom.

The computer reseller has designed a sales force automation application. Initially, the task was time-consuming because Amcom had to tailor its applications to each of an assortment of wireless communications protocols.

"We wanted a higher level interface, so we write one application and run it on a variety of protocol stacks," Vetterani said.

The Relay/Anyplace software allows communications functions to be placed either on desktop systems or communications servers. It supports Novell, Inc. NetWare LANs and networks running IBM's NETBIOS, Vetterani said.

Beating Notes

Another user, Allied Signal, Inc., found Xcellenet's RemoteWare products appealing. Xcellenet offers Communications Management System, which supports a variety of protocols. It also offers Application Management System, which features data access and workflow capabilities so firms can develop PC applications.

Allied Signal, a $14 billion East Providence, R.I., conglomerate focused on the automotive aftermarket, decided in January 1994 to develop a sales force automation system for 200 users. In deciding between RemoteWare and Lotus Development Corp.'s Notes potential application platform, the company found RemoteWare's forms development and reporting features to be stronger, said Kevin McDole, manager of client computing at Allied Signal.

In the summer of 1994, Allied Signal built an application so users with NEC Corp. notebook computers and Hewlett-Packard Co. portable printers could access data stored in an Oracle database management system running on HP Unix servers. By using electronic forms, salespeople can cross-reference items and tell customers if items are in stock or when a shipment will arrive.

The system has been so successful, Allied Signal has developed 22 sales force applications, McDole said.

Budding competition

Small companies such as Relay Technology, Xcellenet and MobileWare, which offers a mobile communications package for NetWare, NETBIOS and TCP/IP, are now bumping heads with established vendors. Oracle last year developed Oracle Mobile Agents, which includes a messaging infrastructure and development tools for companies designing applications that run under Microsoft Corp.'s Windows operating system.

Oracle Mobile Agents interested Kiva, Inc., which builds applications for local, state and federal governments. Kiva, located in Salt Lake City, has developed 10 applications, including a LAN management system and a work order package, said Richard Morrey, company president.

When Oracle unveiled the mobile software, Kiva saw an immediate use for it among city building inspectors. "Most communications packages let a user download information at the beginning of the day, collect data during the day and upload it as the day ends," Morrey said. "But a builder may complete a form and rush it to city hall for approval before an inspector arrives. So the inspector needs to be able to work with up-to-date information."

Digital also plans to be a player in the mobile market. Last June, the company unveiled Mobilizer for Windows, which integrates databases, file systems and mail packages.

The Digital entry underscores increased competition, which, in turn, is leading to improved packages. "Current communications products are still a little rough around the edges but are becoming easier to use," BIS Strategic Decisions' Merriman said. "Potential users should be aware that these packages won't reach the shrink-wrapped stage for at least a few more years."

Korzeniowski is a freelance writer in Malden, Mass., who specializes in networking issues.

NET RESULTS

Skip MacAskill and Melinda Le Baron

100Base-T is reality, not retreat, for HP

Last Monday morning, you could hear the champagne corks popping and the snappy strains of "Ding Dong, The Witch Is Dead" as fast Ethernet proponents reveled in a *Network World* report that Hewlett-Packard Co. will embrace 100Base-T products in its forthcoming spring rollout.

In quintessential congressional budget parlance, it appears we have an answer to the question "Who blinked first?" in the ongoing 100Base-T vs. 100VG-AnyLAN battle.

At least that's the spin the 100Base-T folks — such as 3Com Corp. and Bay Networks, Inc. — will put on this latest HP move. In this politically motivated marketing tussle, which has been quite acrimonious at times, you know the fast Ethernet vendors will use this announcement to slam HP from one end of a CSMA/CD-based Ethernet connection to the other.

The 100Base-T and 100VG-AnyLAN camps have been slugging it out over who has the best 100M bit/sec technology for the last couple of years, so it's easy to understand the fast Ethernet giddiness at play here. HP admitting there are opportunities in the 100Base-T market is akin to Newt Gingrich acknowledging that Bill Clinton made a sound policy decision.

The easiest thing to do here is take advantage of a ready-made opportunity and slam HP for its admission. While we'll have no shortage of people willing to do that, it's very much the short view and nothing more than gratuitous posturing. Haven't we had enough of that in this industry?

How can you slam HP for making a sound business decision? When you get right down to it, that's all this is: a good decision by a net company to take advantage of an excellent business opportunity.

We're not defending HP here so much as defending its decision. Anyone who reads this column regularly knows we are quick to criticize HP, especially in its previous religious adherence to 100VG-AnyLAN. But let's give credit where it's due. With a significant investment and installed base in Ethernet technology, it only makes sense for HP to build 100Base-T products. The company is still convinced that 100VG-AnyLAN is a superior technology and will continue to market and push it, but bypassing an easy way to contribute liberally to the company's financial bottom line would have been idiotic.

HP, however, did stick its neck out on 100VG-AnyLAN. And there is no question the technology will take a hit because of HP's decision. But while the 100Base-T companies gleefully dance around the funeral pyre, they best reassess what the entry of HP means to their market.

HP has considerable resources, channels and distributors that will let it make a major impact in the 100Base-T market if it decides to make a frontal attack.

Just look at the Ethernet presence HP currently enjoys. One could argue that HP and 3Com are the top two Ethernet vendors in small networks and workgroups. If these users want to upgrade to 100M bit/sec technology down the road, HP will have a convincing story to tell.

Think about it. If you're in a market that doesn't include one of the biggest players in the industry and that player suddenly decides to enter that market, should you really be doing the dance of joy?

Laughter turns into tears so quickly in this business.

Le Baron is research director and MacAskill is a senior research analyst in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached by E-mail at inquiry@gartner.com or by phone at (203) 316-1111.

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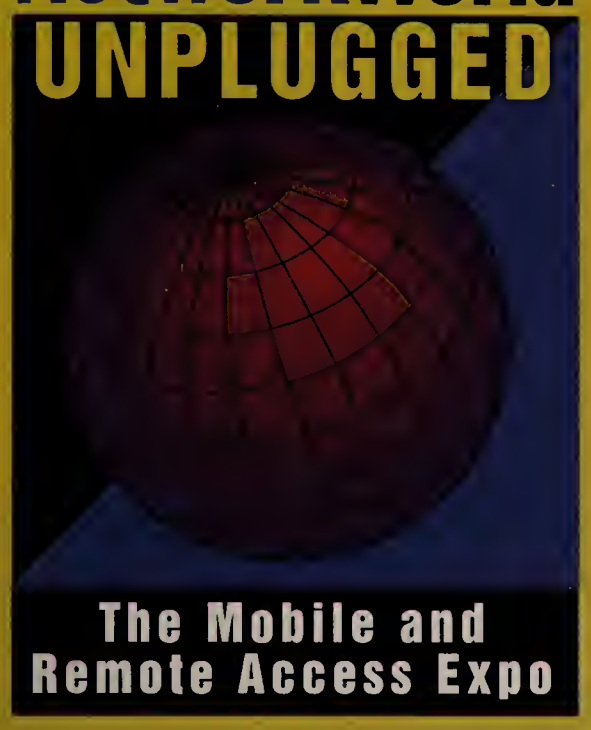

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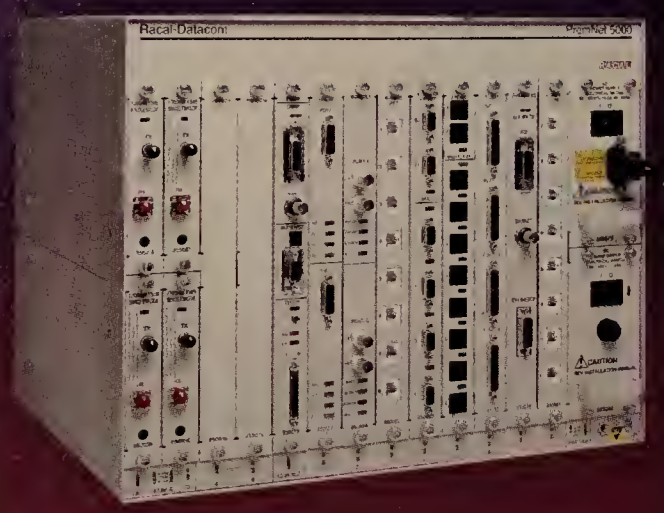

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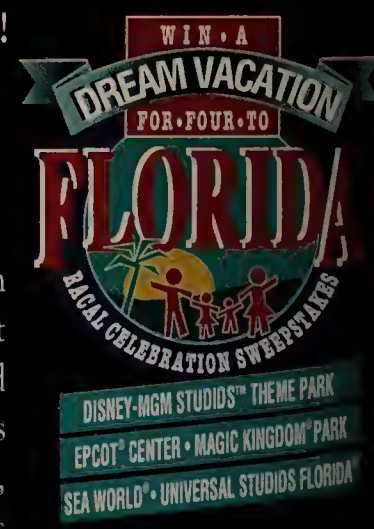

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Briefs

■ *Pittsburgh-based* **Transarc Corp.** *last week began shipping a Windows NT edition of its* **Encina** *distributed on-line transaction processing monitor, which previously ran only on Unix platforms. Windows NT now can act as the operating platform for Encina clients and servers in transaction processing systems. The client software costs $150; the Encina Monitor Suite costs $8,000.*

Transarc: (412) 338-4400.

■ **Blyth Software, Inc.** *of Foster City, Calif., has ported its Omnis cross-platform tool set for* **distributed applications** *to IBM's OS/2 Warp. The move is part of an effort by IBM to provide customers with development tools for distributed applications that can be built and run in multivendor networks. IBM is paying for the porting work and will team with Blyth's stable of independent software vendors to port their applications to OS/2.*

Blyth: (415) 571-0222.

■ **Platinum Technology, Inc.** *of Oakbrook Terrace, Ill., this week will announce InfoReports 2.0, a* **reporting tool** *for relational databases that now has advanced graphing capabilities and support for rich text format used in word processing programs. Reports generated from InfoReports may be run on the client or server. The software will be available next month. Pricing is $695 for Windows clients and $1,395 for Motif. Server software for Unix and Windows NT starts at $10,000.*

Platinum: (800) 442-6861.

■ **The Crescent Division** *of* **Progress Software Corp.** *in Bedford, Mass., is shipping Internet ToolPak software that lets Visual Basic developers build* **Web-based applications.** *The software shields developers from low-level Internet protocols, such as HTML. The software requires Visual Basic 4.0 and costs $199.*

Crescent: (800) 352-2742.

Legacy transition tools aid move to client/server

By John Cox

The mania to move mainframe applications to client/server platforms by brute force seems to be slowing as MIS groups look for a smarter way to blend legacy applications and data with the new realities of distributed client/server networks.

Vendors are responding with tools based on advanced technologies such as expert systems and pattern matching. These tools help companies migrate applications to client/server platforms by giving MIS more transition options.

Client/Server Technology, Inc., an Israeli company with an Atlanta office, earlier this month began shipping 3270 versions of its GUISys and VBSys products, which had been available only for IBM Application System/400 midrange computers.

GUISys reads the datatream coming from the host, uses pattern matching to compare it with a knowledge base of graphical user interface (GUI) definitions and then generates a corresponding Windows display. VBSys, which is a companion product, generates a Visual Basic executable file that can be included in a Visual Basic application. PBSys, another Client/Server Technology product due in June, will generate Powersoft Corp.'s PowerBuilder executables. All three products will support all Microsoft Corp. operating systems by September.

Similarly, Wall Data Inc., has licensed two products from Software Development Tools, Inc. of Boston — RumbaExpress and RumbaAutoGUI — which work with Wall Data's Rumba PC-to-host connectivity software.

RumbaExpress, available now, is a PC-based program that reads the datastream and, also using pattern matching, generates GUI screens. "If you change your host application, the [RumbaExpress] executable still reads the data screen and interprets whatever is there," said Schelly Weedman, Wall Data's product manager.

RumbaAutoGUI, released Jan. 15, is a tool set that captures the user's interaction with a host application by recording all the keystrokes. This information is converted into Visual Basic, PowerBuilder, C or C++ application code.

Another approach to integrating client/server and legacy systems is to smooth the connections between the desktop applications and both client/server and mainframe data sources.

Release 4.5 of ClientBuilder from ClientSoft, Inc. now supports Open Database Connectivity, which means developers working with this tool set can create PC-based GUIs that can access data in relational databases, as well as access host applications. Also new are hooks that let Visual Basic and PowerBuilder client applications link to ClientBuilder's middleware, which in turn connects them to legacy systems — a step toward creating a three-tier application architecture.

When the host application needs to be reworked, developers can turn to tools like ReGenisys Corp.'s Rule Finder. This program reads the legacy source code and then runs it through a set of sophisticated analysis programs to uncover the underlying business rules and complex interrelationships of various programs. Once the rules are identified, developers can maintain the original programs or rework them as client/server applications.

Rule Finder 1.0 works with IBM mainframe-compatible COBOL batch programs. By March, Rule Finder will work on CICS applications and later in 1996, it will support IMS and DB2 databases.

MIS groups that want to outsource the migration/integration work can turn to companies like LexiBridge Corp. of Monroe, Conn.

The company's LexiBridge Migration Services consist of a tool set that automates key steps of the conversion process as well as consulting. MIS groups pay for a onetime conversion of an existing CICS/VSAM or CICS/DB2 COBOL system into, at present, a set of PowerBuilder applications.

Sampling of tools for tying legacy data into client/server applications

Company/Phone	Tool
ClientSoft (914) 631-5365	**ClientBuilder 4.5,** a tool kit for integrating mainframe and AS/400 applications with GUIs, SQL data sources and desktop applications. No changes needed at host.
Client/Server Technology (770) 677-3080	**GUISys 3.0,** available now for AS/400 and by February for 3270 applications. Reads datastream and converts it into a customizable Windows-compatible GUI. Companion products will generate executables in Visual Basic or PowerBuilder.
LexiBridge (203) 459-8228	**LexiBridge Migration Services,** a tool kit plus consulting services for converting COBOL host systems into functionally equivalent client/server applications. No rewriting of code is needed.
ReGenisys (800) 401-7853	**Rule FInder,** which reads legacy source code, converting it eventually into a semantic model. Analysts then can identify the application logic, often hidden in old programs, that define the system's business rules. These rules can be used to develop client/server applications.
Wall Data (206) 814-9255	**RumbaExpress,** which reads a host datastream and converts it into graphical Windows displays. **RumbaAutoGUI,** which generates host navigation code to let PC applications access host data. Can combine multiple screens from different hosts into single Windows screen. Both products are licensed from Software Development Tools.

Users, analysts be warned: Conversion tools have trade-offs

By John Cox

Corporate MIS groups are becoming more savvy about transitioning host legacy applications to client/server.

"In the last 18 months, people have been changing [their plans] from mainframe migration to mainframe coexistence," said Wayne Eckerson, senior consultant for data warehousing at Patricia Seybold Group, Inc., a Boston-based market research company.

"People realize [now] the mainframe is better than client/server for a number of applications and [that] it's difficult to move applications off mainframes," he said.

"The big problem is that existing applications are so tangled together that it's hard to tease them apart," said William Brayman, coauthor with Narsim Ganti of *The Transition of Legacy Systems to a Distributed Architecture,* published last year by John Wiley & Sons, Inc.

"You have to [determine] what the few critical pieces of information are that different organizations in your business have to share," he said.

As a result, users and consultants are now more likely to reject large-scale business process and systems reengineering projects in favor of smaller, more focused and more manageable projects that have a faster payoff.

While new tools that employ advanced technologies can help solve some of these problems (see story, this page), they have limits and tradeoffs, users and analysts warned. So companies

See **Conversion tools,** *page 40*

New interfaces link Web to corporate document management systems

By John Cox

One way to make it easier to use Web servers to support large document collections is to not use them for that purpose at all. Instead, use the Web and the client Web browser as an access point to full-blooded document management systems.

That's the approach taken last week by Interleaf, Inc., of Waltham, Mass., and Documentum, Inc. of Pleasanton, Calif. The two document management vendors announced interfaces that will open the doors of secure, managed document repositories to anyone with Web access.

"In many companies, the Web server is a manually maintained bulletin board," said Robert Reid, Documentum's vice president of marketing. Information is quickly outdated and cannot be updated by end users, he said.

"There is nothing out there that I know of to manage large collections of Web documents [in HTML format] or manage all the links [between documents] with the capabilities you find in traditional document management systems," said Frank Gilbane, director of CAP Ventures, Inc., which researches the digital document industry. "The real benefit [with the Web interface approach] is that these vendors can provide customer access via the Web to their documents."

Interleaf is now shipping an early version of Intellecte/BusinessWeb, which consists of a set of HTML files, Common Gateway Interface scripts and new programs called Persistent Clients, all of which link browser activities to a runtime version of Interleaf's Liason API. Liason lets users run Intellecte/BusinessWeb on any Web server. Liason then handles communications to the Interleaf Relational Document Manager (RDM) and other Interleaf and third-party products. The Intellecte/BusinessWeb package costs $25,000. RDM is priced separately.

"The real benefit [with the Web interface approach] is that these vendors can provide customer access via the Web to their documents," Frank Gilbane said.

A Rockwell International, Inc., company in Milwaukee uses an alpha version of Interleaf's software. Rockwell Automation (formerly Allen Bradley Co.) can now let up to 14,000 divisional employees access via a Netscape Communications Corp. site license up to 20G bytes of product data sheets, customer manuals, price lists and anything that can be stored and managed by RDM, according to John Borger, systems analyst with the MIS group. "With the Internet, the big focus is on consumption of documents," he said.

Web use is making it simpler and less expensive for end users to access the document repositories at different sites over the WAN, Borger said. And those benefits are, in turn, attracting additional departments, such as human resources, which is talking with Borger about how to get its documents on-line so they can be accessed via the Web. "I can see this mushrooming," he said.

Documentum's server-based Accelera software lets Web browsers navigate and query the company's Docbase document repository, which manages an array of document types and formats, supports routing of documents and includes built-in workflow and search capabilities. Accelera will ship in March; pricing starts at $20,000 per server for the Internet. Intranet pricing will be based on number of users.

✆ Documentum: (510) 463-6800; Interleaf: (617) 290-0710.

COMMENTS?

See "How to reach us" on page 6.

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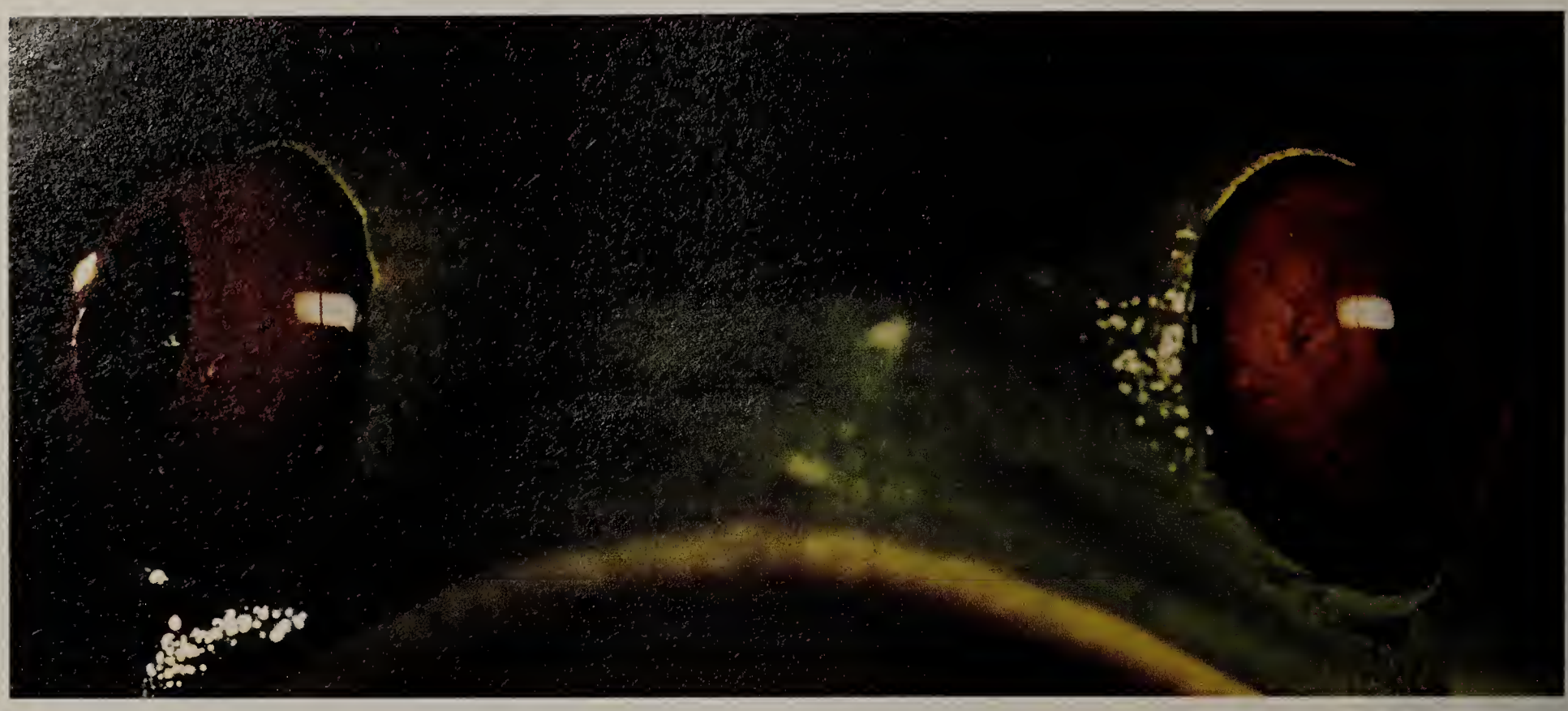

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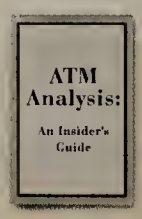

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Object databases

Objectivity adds replication to database management system

By Barb Cole
Mountain View, Calif.

Objectivity, Inc. last week announced Objectivity/DB 4.0, a new version of its object database management system that now supports data replication across networks.

Version 4.0 offers an add-on dubbed Objectivity/Data Replication Option that handles replication between servers.

It also creates replica databases, also called hot standbys, that are brought online in the event of a network or server failure.

Objectivity/DB is an object database for building applications using object-oriented languages such as Smalltalk and C++.

With Objectivity/Data Replication Option, administrators may define any number of servers as replicas.

The addition of replication is key to deploying high-availability applications, which are required to be up and running nearly all the time, Mitch Kramer said.

When users try to update data, the database automatically determines if the update is allowed based on predefined criteria.

The addition of replication is key to deploying high-availability applications, which are required to be up and running nearly all the time, according to Mitch Kramer, an analyst at Patricia Seybold Group, a market research firm in Cambridge, Mass. Replication ensures that if a server goes down, a replica database that reflects recent transactions can be brought online quickly.

Kramer said Objectivity's replication is more flexible than some of its competitors' in that it allows administrators to make either single database replicas or multiple database replicas across the network.

In addition to replication support, Version 4.0 now lets administrators make structural changes in the database — creating, deleting or modifying class definitions, attribute data types and object relationships — without taking the database off-line.

The new release is also about 15% faster than the previous version due to improved indexing, according to William Evans, vice president of marketing at Objectivity.

Other enhancements include the addition of native look-and-feel database administration tools for the Open Software Foundation, Inc.'s Motif, Windows NT and Macintosh, and support for the Object Database Management Group's ODMG-93 C++ standard.

Users applauded the new replication features.

"The replication functionality in [Version 4.0] ensures that our mission-critical application will never go off-line," said a product manager for a manufacturer of digital switching, transmission, access and private network system products for the telecommunications industry.

Available in the second quarter for Unix, Windows and Macintosh, Objectivity/DB Version 4.0 costs $3,000 for a single-user server.

The Objectivity/Data Replication Option is priced at $750 per server.

✆ Objectivity: (415) 254-7100.

New Objectivity/DB features

- Add-on software for replicating data
- Support for data conversion without interrupting access to data
- Native look-and-feel tools for Motif, Windows and Macintosh desktops

SHARED LOGIC

Marc Myers

InterOffice gets ready for the road

Oracle's InterOffice, due to hit the street in April, will not only compete directly with Microsoft's BackOffice, but also attack the critical issue of enterprise database connectivity.

Oracle, the world's leading database vendor, is the obvious choice for hooking those databases together. InterOffice, behind all the marketing hype, is really a solution for distributed databases. Oracle databases. However, this does not reduce its usefulness in my mind. If you have Oracle or want to move to Oracle, InterOffice sounds like a great tool.

I spoke with Joe Vassallo, Oracle's vice president in charge of InterOffice, to get a handle on what this suite of products includes and how it's going to work. I'll try to break it down for you here.

InterOffice consists of three components: Base Server, Desktop and Manager. Base Server is Oracle7 with some new functionality: the ability to store and retrieve nonstructured data such as HTML pages.

Base Server also is going to be bundled with Oracle's new GroupWare messaging server, code-named Pegasus, which provides Lotus Notes-style messaging, including document management, discussions, automatic journaling and automatic recovery. What's cool about Pegasus is you can access it either from a Windows front end or a Web browser.

The InterOffice desktop offers standard Windows integration, a Web browser and an E-mail client. It also ships with the Command and Control console that hooks directly to the Manager component.

The InterOffice Manager is the part that really captured my interest. According to the marketing department, it allows you to control from a single console literally thousands of Oracle servers in a "lights-out" distributed environment. This includes remote software installations, remote software updates, remote database administration, remote network administration and remote systems administration on sites that are either independent or replicated. Wow... could it be true?

InterOffice is not trying to replace the CA-Unicenter's of the world. It can't manage hubs, routers and ISDN lines. It only manages database servers and operating systems. But it is supposed to integrate tightly with SunNet Manager and HP's OpenView.

Vassallo said Oracle has a beta site running InterOffice at over 3,000 branches, with a single console controlling the whole works. The console is optimized for TCP/IP and communicates with agents on each server. The user interface is a map paradigm, so you can click on servers and drill down to get more information.

This is attractive technology, and naturally, many sites will try to extend it to manage applications and other server processes. Oracle provides an API for this purpose.

InterOffice is priced for volume sales: The workgroup version costs only $2,995.

What's also attractive about InterOffice is the fact that Oracle is not offering it in pieces — one price includes everything. You don't have to buy the management console separately or the mail clients as an add-on. It's a suite, so you get everything.

While the robustness of the agents and the intermachine communications will only be known over time, the product architecture addresses a real need in the marketplace for central management of distributed databases.

Myers is president of Client/Server Connection, Ltd., a Cambridge, Mass., firm specializing in client/server software solutions. He can be reached at (800) 622-1108, Ext. 522, or via CompuServe at 71332,1726.

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Conversion tools

Continued from page 33

need to weigh both carefully as they decide the best way to proceed.

Will screen conversion tools, which turn a host terminal screen into a graphical PC-based display, scale well in large, transaction-intensive environments?

And how much of the total conversion job will the code-generation tools actually handle?

"You have to be wary of these products," cautioned Brayman. "They are very much point solutions."

The tools address only a small part of the overall transition issues, agreed William Ulrich, president of Tactical Strategies, Inc., a redevelopment consultancy in Aptos, Calif., and author of The Systems Redevelopment Methodology, a set of project management templates and guidelines for transition projects marketed by James Martin & Co. in Reston, Va. MIS groups should employ a methodology to systematically tackle complex legacy transitions.

Another potential drawback is that users may convert or modify legacy applications but find themselves hamstrung by a two-tier client/server architecture, said George Paulakis, director of the IT architecture practice at systems integrator Trecom Business Systems, Inc. in Edison, N.J. Trecom recommends phasing in a logical separation of presentation logic, business rules and data — a three-tier architecture.

"Then I can retire parts of the legacy application and move to a full client/server environment without impacting my presentation and business logic," he said.

Based on his experience, Brayman warned that MIS may find many legacy systems so "trashy" that very little in them can make the transition. "What you need to do is salvage what little you can and move on, rather than reconstructing the system," he said. "That's hard for people to accept." ■

LEGACY AND CLIENT/SERVER APPLICATIONS: MIGRATION OR INTEGRATION?

Things to think about:

- **Clarify what you want to achieve:** Lower operational costs, more flexible applications or full-scale distributed architecture.
- **Make the first project manageable:** Start with a legacy system that's small enough to be adapted readily but important enough to deliver value for the business and end users.
- **Be prepared for the worst:** You may find the legacy system is so "trashy" that your only option is to salvage what little you can and rewrite it.
- **Know the limits of your conversion and migration tools:** They may be effective but only address part of your problem. Also, they may not scale well for large user populations or heavy transaction volumes.
- **Be prepared for the status quo:** Sometimes your best option will be to keep living with some of your legacy systems.

BusinessBriefs

Imaging software maker **Caere Corp.** and workflow software provider **ViewStar Corp.** have called off their merger. Caere last week decided to pull out of the deal over concerns that the transaction could not be accounted for as a pooling of interests. Caere claimed a number of ViewStar shareholders opposed the merger and a substantial percentage of ViewStar employees may have been planning to quit following the merger. ViewStar now is demanding a break up fee of $1.2 million and is considering a lawsuit.

Message-oriented middleware provider **Momentum Software Corp.** has announced a deal to entice users of **Covia's** middleware to switch over to Momentum's product. Until April, Momentum will give Covia Communications Integrator customers Momentum X*IPC license free if they sign up for an annual maintenance license.

Compuware Corp. of Farmington Hills, Mich., reported that revenue for the third quarter ended Dec. 31 **rose 9.4%** to $161.3 million, compared with the previous year's third quarter. Earnings fell largely due to costs involved in buying CorNet Management Systems.

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Access begins with ACC.

Workflow giant FileNet snaps up Saros

Acquisition will help company compete in large-scale imaging market where IBM, Wang dominate.

By Barb Cole
Costa Mesa, Calif.

FileNet Corp. will use technology acquired earlier this month to offer customers a one-stop shop for networked workflow, imaging and document management applications.

The company's Jan. 18 acquisition of document management software-maker Saros Corp. for $100 million will help FileNet compete with IBM and Wang Laboratories, Inc., which have dominated the large-scale imaging market, analysts said.

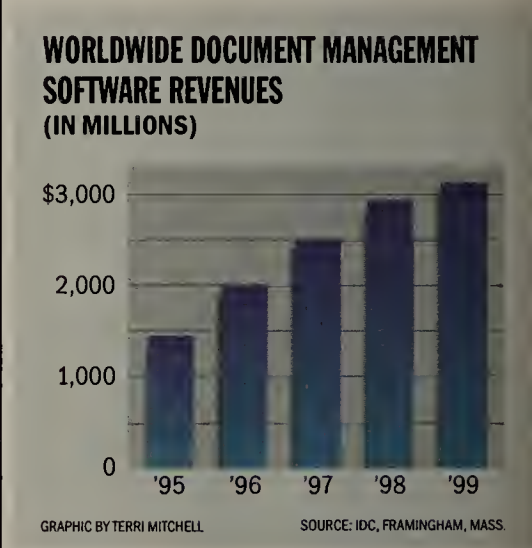
FileNet will use Saros' document management system as part of an integrated suite of software that combines document imaging software, acquired last year from Watermark Software, Inc., and workflow and document management software.

The suite also will include Computer Output to Laser Disc (COLD) technology FileNet purchased earlier this month from Greenbar Software, Inc. COLD software is used for archiving documents that originate from mainframes or magnetic and optical disks.

Saros' document management software makes it possible to create a storehouse for corporate data to manage word processing documents, spreadsheets, drawings, video and other files.

The software typically handles version control and lets users view documents without having the associated application loaded at their desktop.

Unlike FileNet's traditional document imaging applications, which are typically used to automate departmental processes, document management applications tend to span the enterprise, analysts said.



"Saros is already selling 10,000-seat licenses, which is kind of unheard of in the imaging world," said Bruce Silver, principal of Bruce Silver Associates, a market research firm in Weston, Mass.

In addition, the Bellevue, Wash.-based Saros recently shipped @mezzanine, a version of its software for managing documents over the Internet.

FileNet officials said the firm will offer a Windows NT-based suite aimed at midsize companies and departments in large organizations, as well as a family of integrated high-end products.

The goal is to let customers manage unstructured data across enterprise nets as well as the Internet, according to Jordan Libit, FileNet's vice president of marketing. The company is expected to release more details on those products in April.

At least one Saros customer had mixed feelings about the acquisition.

"FileNet's resources will certainly help Saros, but I'm a little confused as to how this benefits users of [Saros'] Mezzanine," said Greg Rispler, vice president of information services at First Boston, an investment firm in New York that has about 1,000 users on the document management system.

"Workflow and imaging are not a high-priority for us," Rispler said.

✆ FileNet: (714) 966-3400.

Electronic Commerce

Covering: Tools and Techniques for Interenterprise Networking and Doing Business On-Line

Briefs

■ **Hummingbird Communications, Ltd.** *of North York, Ontario, is releasing at ComNet '96 this week its Columbus desktop, a Microsoft Corp. Windows 3.1-based environment to* **manage Internet and intranet information.** *It includes document management technology from Common Ground Software, Inc., which Hummingbird recently acquired, as well as a Web browser and electronic mail interface. Columbus also includes such common 'Net applications as FTP, Gopher and a newsreader.*

This release costs $245 per user; Windows NT and Windows 95 versions are scheduled to ship later this year.

Hummingbird: (905) 470-1203.

■ **MCI Communications Corp.** *promises to* **can spammers.** *The company announced that it will not tolerate customers using its electronic mail, Internet access or Web hosting service to mass-distribute unsolicited E-mail messages. MCI warned that violators of the policy could have their service terminated.*

■ **Atalla,** *a division of Tandem Computers, Inc., said it is ready to ship the WebSafe II Internet Security Processor, a* **hardware encryptor** *for the Web that scrambles information. WebSafe II uses multiple protocols, including Secure Sockets Layer, Secure HTTP and Privacy Enhanced Mail. Atalla also plans to add support for Secure Multipurpose Internet Mail.*

Atalla: (408) 435-8850.

■ **McAfee** *of Santa Clara, Calif., announced it has found a way to remove the* **Winword.concept computer virus** *known to be affecting Microsoft Corp. Word files since October. The beta version of McAfee's virus remover can be accessed at www.mcaffee.com or the bulletin board system at (408) 988-4004.*

The Web in sickness and in health

By Ellen Messmer

Corporations that offer a choice of health care plans are finding a new way to distribute insurance information and sign up employees. Yup, you guessed it. They're using the Web.

At GTE Corp., 100,000 employees get to pick and choose from among seven insurance plans. To help workers untangle this mess, the company last fall began testing a Web-based interactive service called Health Fair Online from MedAccess Corp. The service provides up-to-date information through standard browsers.

"We can provide people with much more material than we can provide in print," said Dwight McNeill, GTE's health care information manager. The MedAccess Web site, with pages customized for GTE, provides a plan-by-plan comparison of costs and benefits. The site also contains hyperlinks to information on participating physicians.

GTE has about 50,000 retirees eligible for insurance. Since they are no longer using the GTE computers, it's not likely Web-based enrollment will ever totally supplant the paper packets of information and forms that get distributed.

"But this offers immediate savings for us, and it's a good alternative," McNeill said.

According to Jaime Taafe, president and chief executive officer at MedAccess, its costs $5 to $10 per employee annually to put insurance plans and open enrollment on the Web.

In its own pilot, GTE collected health care information in electronic form from the insurance providers, and MedAccess loaded the data onto back-end databases connected to the Web by T-1 lines.

"It's customized and tailored to the individual," Taafe said. As a security check, users accessing the Web site have has to input passwords, social security numbers and personal identification codes.

The Web is also becoming the vehicle to deliver other medical information services.

Malden, Mass.-based HealthGate Data Corp. has taken eight continually updated medical databases generated by U.S. government agencies and the private sector and converted the text from proprietary formats into HTML.

One technical database, MedLine, is used by physicians only. Others, such as Consumer Health Reports, are for reading by the general public.

MedAccess' *Jaime Taafe says his service is 'customized and tailored to the individual.'*

The databases are set up for simple searching by using a natural-language query from users, said Bill Reiss, CEO at HealthGate. "You can use it with any browser," he said.

Beth Israel Hospital in Boston recently subscribed to the HealthGate Web site, joining individual physicians across the country.

"I use it as part of my practice," said Dr. Dennis Frisman, a physician at a clinic in the Long Beach, Calif., area who finds it convenient to check MedLine over the Web.

At a cost of $14.95 per month for physicians and $7.95 for consumers, MedAccess is also fairly affordable, Frisman pointed out.

✆HealthGate: (617) 321-6000; MedAccess: (617) 863-8588.

Developers distinguish Web products with bundles, security

By Peggy Watt

New World-Wide Web sites are rolling out by the hour, and Webmasters have a growing selection of Web server software to get sites up and running quickly.

Differentiation is the name of the vendor game. Recent offerings from Trusted Information Systems, Inc. (TIS), O'Reilly & Associates, Inc. and Frontier Technologies Corp. boast various bundles, including development and administrative tools, security functions and hardware.

But extras aren't everything. Network managers choosing a Web server should consider use and content, and also evaluate their network's vulnerabilities, said Hans Von Braun, a director at the testing labs of Creative Strategies Research International, Inc. in San Francisco. "First, they should decide whether their Web site is informational and can go outside the firewall," he said.

Industrial-strength security is the hallmark of an update to Gauntlet Internet Firewall 3.1, released last week by TIS of Glenwood, Md. The $11,500 system, which runs on several Unix platforms, includes Web and File Transfer Protocol servers integrated in the firewall and secure POP3 electronic mail.

"Gauntlet is a combination of a firewall and [a Secure HTTP] server," said Frederick Avolio, TIS's marketing director. "The firewall protects the entire enterprise" when the Web server is on a corporate LAN, he said. (For more firewall coverage, see our Review on page 59.)

An early entry, O'Reilly & Associates of Sebastopol, Calif., recently updated its WebSite server for Windows NT and Windows 95. WebSite 1.1 adds the HotDog HTML editor and support for virtual servers, which can host hundreds of sites on a single software platform, said Jay Weber, an O'Reilly WebSite developer.

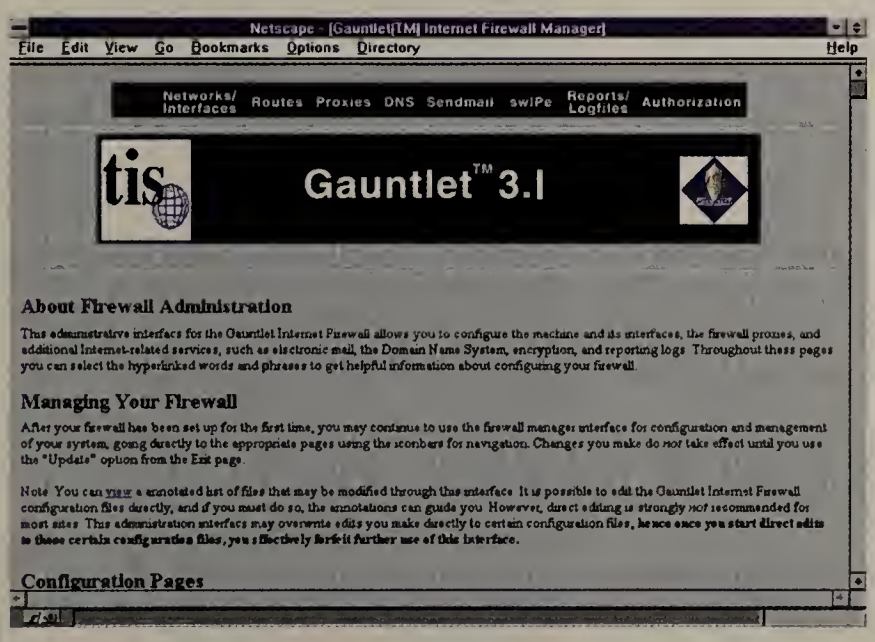
In development is WebSite Professional, which supports Secure HTTP and Secure Sockets Layer (SSL). WebSite Professional was developed with Terisa Systems, Inc.'s SecureWeb Client and Server Toolkit 2.0, which was also announced this month.

"Adding the security and encryption will make [WebSite] a very solid product, and most MIS directors will be very comfortable with it, especially if they don't want to use Unix," Von Braun said.

The updated WebSite retains its $499 price; upgrades cost $55.

Frontier Technologies of Mequon, Wisc., recently announced a secure version of its SuperWeb server, which will add support for Secure HTTP and SSL. SuperWeb runs on Windows and has graphical administration tools, an HTML editor and remote administration.

✆TIS: (301) 527-0482; O'Reilly: (800) 998-9938; Frontier: (414) 241-4555.



TIS' *Gauntlet Internet Firewall provides graphical management software to help administrators set up and maintain the secure Web server and firewall.*

ON LINE

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BUSINESS SPACE

Mark Gibbs

Site from Uncle Sammy is a real whammy

I was browsing around trying to find something on the Web when I hit FedWorld (www.fedworld.gov). It was not, of course, the something I first started looking for, but hey, that's the Web.

This is a slick site, which, considering it is part of the federal government, is pretty surprising. Created by the National Technical Information Service (NTIS), FedWorld aims to be a "comprehensive central access point for locating and acquiring government information" — and they are doing a pretty fine job.

Now the government has made big commitments to being on-line, and if FedWorld is any indication, they are making headway. But what will be the final result? Well, it should be a well-structured, information-efficient, highly connected government.

Sure. And Elvis is going to be elected president when he comes out of hiding. Or is that when the aliens return him? No matter.

Just imagine what interfacing with the government might be like in the future...

April 15, 2010: You access the government (redtape.gov) to file your taxes (a mandatory requirement) and your authentication fails due to the almost constant overloading of the government's section of the Internet.

The E-forms were digitally stamped by a onetime transfer system to ensure that taxpayers can't submit multiple filings. The government instituted this after the tax revolt of 2002, when 500,000 protesters overloaded the IRS computers in 10 minutes flat by filing 1,000 returns each on an organized day of protest. No one paid taxes for a year.

Since the authentication failed, you now cannot file. You send messages to every bureaucrat you can identify and receive 144 acknowledgments from the government "mailbots" explaining that due to the depth of the mail queues, you should expect a reply within 66 working days.

The 'bots refer your request to other government 'bots, and you receive 2,210,000 help messages on the same day. Your cable company bills you $140,000 for exceeding your disk space allowance.

April 22: A week later and you have finally cleared the 2,210,144 messages. The 2,210,145th is a message from an IRS 'bot that you can't identify, saying if you respond within 24 hours (which elapsed six days ago), you will be permitted to resubmit.

The IRS computers kick into gear for late filing and run a credit check on you. The $140,000 bill from the cable company shows up, so they put a lien on your goods and chattel, and freeze your accounts. You send a rude note to your congress 'bot in which you suggest that the IRS and your cable company should be the first to be shot when the revolution comes.

The FBI terrorism 'bot notes your message and, seeing a gun-related threat, runs a background check on you. Due to a transmission error, the data from your bank is corrupted and gets merged with a CIA transmission on a drug baron in Central America. You are now positively identified as Juan Garcia De Cortez, who has just received a payoff of $140,000.

April 29: You open your front door and find the IRS repossession squad and the FBI engaged in a firefight over who gets to arrest you. The cable company is busy disconnecting your 100M bit/sec cable link with dynamite.

Perhaps I'm exaggerating, but don't count on it.

Next week, I move to a new spot on the back page alongside Dave "The Rave" Buerger. Be there or be square. If you've seen Elvis or believe in aliens, drop me a note at mgibbs@gibbs.com or call me at (800) 622-1108, Ext. 504.

NETWORK HELP DESK

Network World *tracks down answers to your questions. Please submit them to Jim Brown via phone at (800) 622-1108, via the Internet at jbrown@nww.com or via fax at (508) 820-1103.*

Is there a way to figure out the difference in manpower cost for managing a network when you use frame relay over leased lines, or even the Internet, for node interconnection?

Will Estes, U.S. Computer, Saratoga, Calif.

Little quantitative research has been donc in this area, says Steve Taylor, president of Distributed Networking Associates in Greensboro, N.C. But here is some qualitative insight.

Manpower cost using each type of service will vary not only by how many people you need, but by the types of tasks they perform. With leased lines, your staff will perform many of the day-to-day management tasks but will be aided by the tools provided with network equipment.

If you move to frame relay, your hands-on management tasks are relieved since many duties, such as automatic alternate routing, are performed by the carrier. This may result in a slight decrease in your head count, but you'll probably need to train remaining staff on how to manage the virtual network capabilities of frame relay.

Tools that enable you to take greater control for managing frame relay networks are being developed and could change your manpower equation. The Frame Relay Forum has published its "Customer Network Management Implementation Agreement," a specification that spells out how users can obtain frame relay performance monitoring, fault detection and configuration information from carriers.

You can grab the document off the World-Wide Web by visiting http://frame-relay.indana.edu/5000/5001-approved.html.

Jay Pultz, research director at Gartner Group, Inc., agrees with Taylor that you'll incur some staff retraining costs in moving from leased lines to frame relay. However, he says frame relay may add flexibility by making it easier to do things such as adjust permanent virtual circuits.

It's unclear how using the Internet

Dynamic host protocol takes the sting out of configuring TCP/IP

By Ralph Droms

TCP/IP stacks can be a pain to configure, especially if you are trying to run a large internetwork. That's why more and more network administrators are embracing clients, servers and routers that implement the Dynamic Host Configuration Protocol (DHCP).

An IETF standard, DHCP simplifies the time-consuming, labor-intensive task of configuring TCP/IP stacks on network clients. It does so by allowing a computer that uses TCP/IP to obtain configuration information, such as its Internet Protocol address, from network servers rather than from a local, manually maintained table.

DHCP servers assign a computer an IP address from a pool of available addresses. If the computer moves to a new subnet or is removed from service, the address can be returned to the pool and reassigned.

Extending the bootstrap

DHCP is based on the Bootstrap Protocol (BOOTP), an Internet standard designed for manual preconfiguration of host information in a server database. DHCP differs from BOOTP in that it allows for the automatic allocation of IP addresses. It also supplies all of the configuration information defined in the TCP/IP specifications, as well as application-level details for print and file servers, for example.

DHCP is based on a client/server model: Servers manage IP addresses and other configuration parameters; clients request that information from them. Specifically, a client computer broadcasts a message looking for DHCP servers. Those servers look up the appropriate configuration for that client and respond to it with a message containing the information.

Based on selection criteria, such as first to reply, the client chooses a server and sends it an acknowledgment. The server responds with a confirmation of the configuration. At this point, the computer's TCP/IP stack is configured.

DHCP clients can only communicate directly with servers on the same subnet because the protocol is based on local broadcast. But a DHCP server can manage multiple subnets. It uses relay agents to forward DHCP messages between the disparately networked clients and servers.

The relay agents, which are typically located in IP routers, must be configured with the addresses of the DHCP servers. Using relay agents increases complexity but eliminates the need for a DHCP server on each subnet and reduces the infrastructure cost.

Time's up

The dynamically allocated IP addresses can be used for a finite period called the lease. When the lease expires, the client must release the IP address so it can be reallocated to another computer. A DHCP client can apply to its server for an extension.

The reuse scheme is important since only a limited number of IP addresses are available. In addition, temporary IP addresses are useful for laptops and other mobile hosts that only need network connectivity for a short time and for computers and computerized equipment that are frequently moved from one office to another.

Besides using DHCP to obtain a new IP address, a computer relies on the protocol to confirm the validity of its address and configuration.

Each time a computer reboots, it sends a DHCP message to its server. The server can then send back new configuration parameters if necessary.

This capability comes in handy when network administrators need to renumber all the computers on a subnet. They first change the server databases and then restart the affected computers. As each computer reboots, it is reassigned an address based on the new numbering scheme.

Even if a computer does not support DHCP and must have its IP address manually configured, it still can use the protocol to obtain other configuration information.

Manually allocated addresses are simply omitted from a server's address pool. DHCP can then be used in mixed networks where some addresses are allocated automatically and some are configured manually.

Despite the hassles associated with manually configuring TCP/IP stacks, network administrators may feel more comfortable permanently assigning addresses to key systems, such as central file, database management system and mail servers. They also have no choice but to manually configure platforms that do not support DHCP.

A classy idea

DHCP offers a classing scheme letting network administrator identify groups of computers that should be configured similarly. The mechanism allows groups of computers on a single subnet to have different configurations. For example, computers in the accounting and purchasing departments can be organized into different classes, with each client configured to use its respective department's local printer.

Most major client, server and router vendors support DHCP. Microsoft Corp., for example, offers DHCP client code in Windows 95 and sells a DHCP server. Unix vendors like Hewlett-Packard Co., Silicon Graphics, Inc. and SunSoft, Inc. have DHCP client code and some have DHCP servers.

Missing from the bunch are Apple Computer, Inc. and IBM, both of which will soon have code.

The IETF working group responsible for DHCP has conducted tests among several implementations and confirmed independently developed versions of the protocol can successfully interoperate.

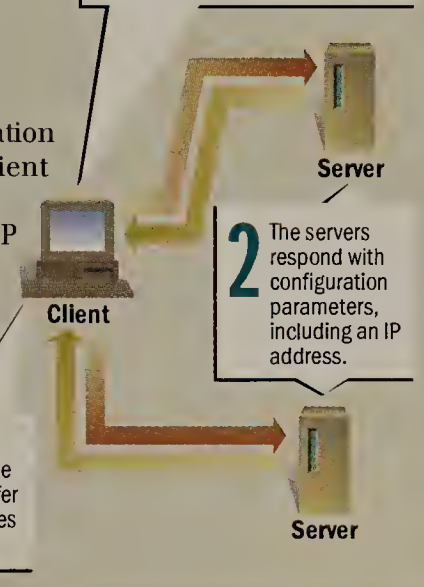
So a network administrator can use a single DHCP server to manage DHCP clients from many vendors.

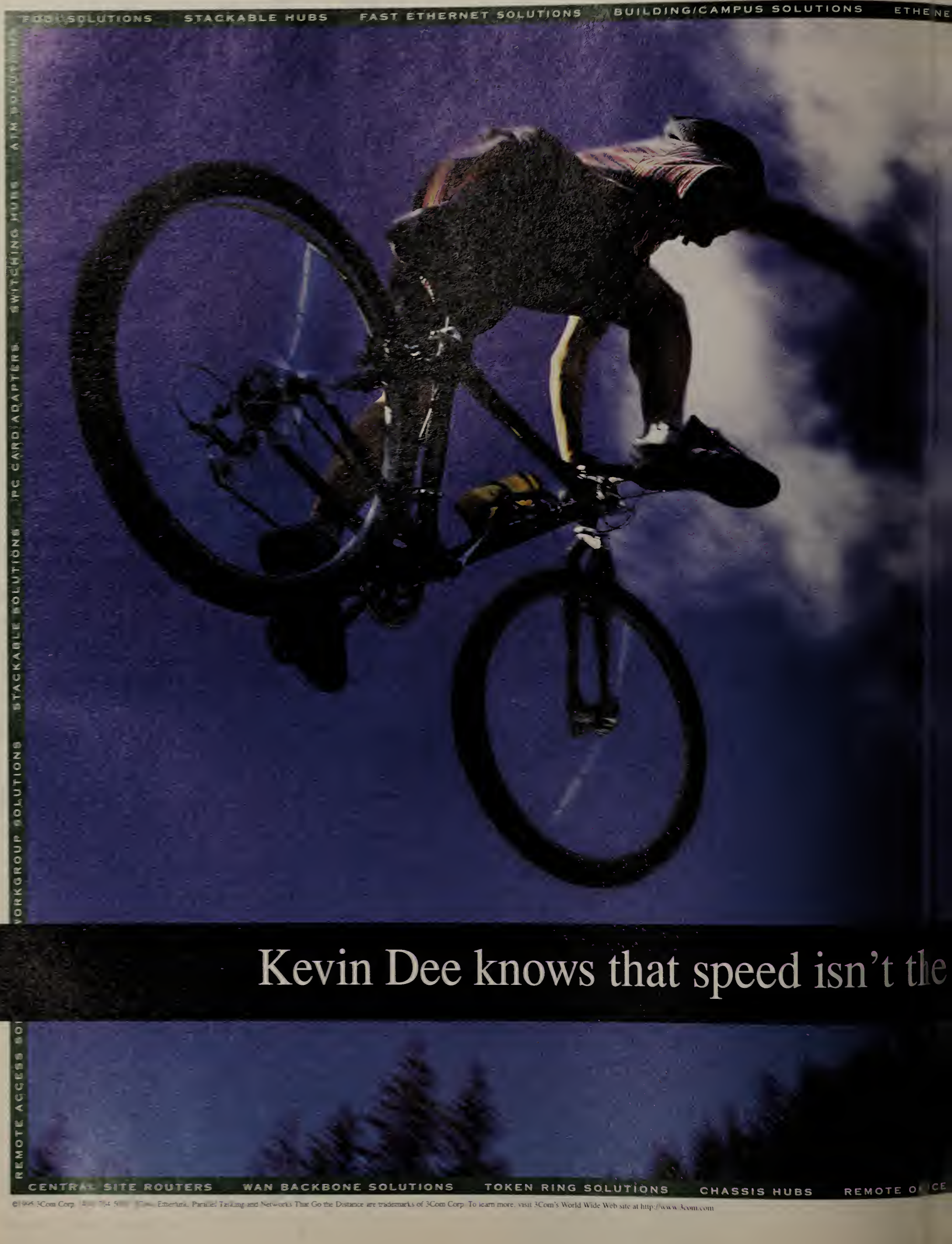
Droms is chair of the IETF's Dynamic Host Configuration Working Group and associate professor of computer science at Bucknell University in Lewisburg, Pa. He can be reached via the Internet at droms@bucknell.edu.

HOW IT WORKS

Automated IP addressing

The Dynamic Host Configuration Protocol (DHCP) allows a client to obtain its Internet Protocol address and other TCP/IP configuration parameters directly from servers. Without DHCP, network administrators have to manually configure client TCP/IP stacks.





only thing.

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NETWORKS THAT GO THE DISTANCE

EDITORIAL INSIGHTS

Ouch, ouch, ouch

During the past few weeks, we've received a flood of E-mail about our work on two touchy subjects: hate groups on the World-Wide Web and Apple's struggles. (The hate group piece has generated so much attention that the NBC Miami affiliate is taping an interview with our news editor as I write this.)

Getting mail is one of the most rewarding parts of this job; it means we've gotten readers thinking. But some of what I find in my in-box worries me. Consider these excerpts from E-mail about my "Web of hate" and "Apple's real problem" editorials.

"*Network World* wants subscribers to squeeze [Internet service providers] into self-censoring. If I subscribed to *Network World*, I'd be cancelling. The editor who wrote this is obviously a dips---. So boycott *Network World*. *Network World* = dips---s. I'm sure there's [sic] moronic articles spewing out of that pulp factory right and left."

"Your piece contained nothing of value. I've been reading for over 10 years from punks like you how Apple can't last the year."

"Apple's Real Problem is no-talent, dime-a-dozen wanna-be-pundits like yourself. Just because corporations (and the parasites who create trade journals for them) are the most me-too middle-of-the-road lot around doesn't mean they know (or care) what's right for the actual users of technology . . . Your tiresome moaning about Apple's failures in innovation is unjustified . . . if you could innovate, you wouldn't be in journalism . . . P.S. I'll bet you listen to Top 40 or country music, watch a lot of TV, and eat boring food."

Ouch, that last bit really stung. Seriously, it isn't unusual to receive E-mail like this in response to a controversial topic, and when I read it, I wonder what prompts this electronic vitriol. The world is becoming a global village, but are we becoming less civilized as we blast our thoughts at one another behind the shield of a monitor? Why do people feel comfortable adopting this cyber-hostility — one they might never exhibit in face-to-face dealings?

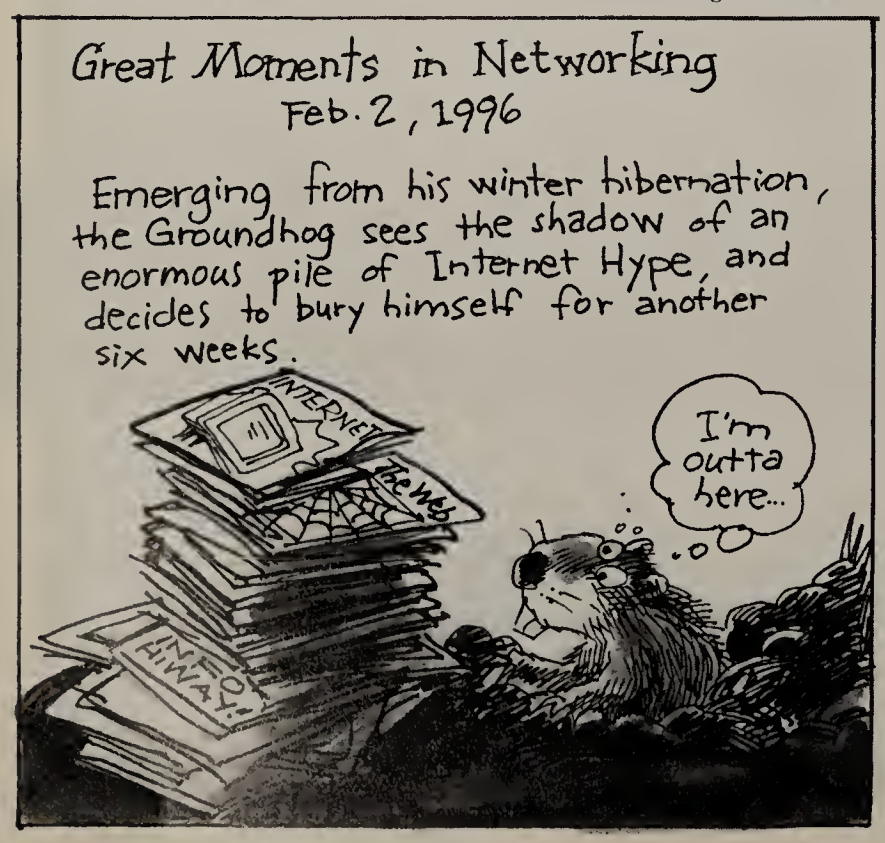
Are we becoming an electronic community or will networking just exacerbate the divisiveness of society? Will we communicate more effectively, or use the technology to bully one another? Will we find common interests or break into splinter groups? It's something to consider as our lives and businesses go on-line.

Hey, maybe I'm just too sensitive. (I have been meaning to cut back on TV.) What you do you think?

John Gallant, editor in chief jgallant@world.std.com

Teletoons

By Phil Frank and Joe Troise
guru@well.com



SPEAKING THE LANGUAGE

Get ready to meet the challenge of continuous network uptime

Linda Musthaler

As more and more mission-critical applications are hosted on network platforms, you are saddled with the daunting challenge of providing continuous network uptime — something that was once reserved only for the Big Iron in the glass house. Are you prepared to meet the challenge?

I recently met with a group of people who have banded together to share their ideas and experiences for providing continuous computer uptime. The Uninterruptible Uptime Users Group (UUUG) consists of people whose livelihood depends on providing uninterruptible uptime infrastructures — IS and data center personnel, telecommunications managers, computer technologists and building managers.

UUUG believes that it takes proactive plans and cooperation from diverse personnel to improve reliability in computing — hence, the group's unlikely combination of computing professionals and facilities maintenance people.

Unfortunately, UUUG currently lacks representation from two key groups: network managers and vendors. It seems to me that companies will never achieve network uptime success without these contingents.

The point is that everyone, not just the network manager, has a stake in keeping the network up and reliable. You can be the hero by taking the lead in getting people to work together.

In many organizations, it has taken years for the enterprise network to garner the respect it deserves. Users still have their doubts about putting business-critical applications on distributed systems. That's why it is imperative for network managers to assure users of network security, data availability and maximum uptime.

Don't feel like you have to go it alone, however. Continuous uptime is a team effort. For a comprehensive approach to uptime, the team should include IS personnel, facilities managers, your internal customers (users, that is), your company's telecommunications manager, security experts (physical and network), outside service providers such as utilities, and strategic vendors and suppliers.

Among the IS team members should be network specialists, application developers, data administration, and service and support personnel.

Granted, this uptime team is going to include people with dissimilar backgrounds and areas of expertise. What's more, these people don't normally talk to one another.

The point is that everyone, not just the network manager, has a stake in keeping the network up and reliable. You can be the hero by taking the lead in getting people to work together.

Total uptime solutions are built on a combination of technology and procedures. Quite frankly, technology is the easy part. Procedures are more challenging because they involve clear communication among these people with the diverse backgrounds.

It's important that everyone clearly communicates needs and expectations and be willing to compromise when necessary. For instance, is your internal customer just assuming 24-hour availability of the network or have you developed an actual service-level agreement that commits you to it? If 24-hour availability is an absolute requirement, is the customer willing to pay for it? Help your customer understand what continuous uptime will cost. It can quite easily double the cost of computing as you invest in all sorts of redundant systems, from servers to power sources.

Discipline is another important aspect of network reliability that is often overlooked. A data center manager recently showed me some pictures of a few file servers at his company. More accurately, the pictures were of the backs of the servers, which looked like a spaghetti bowl of wires and cables.

The servers were plugged into a power strip, which was plugged into another power strip, which was then plugged into the wall. That was a lot of equipment for just one unconditioned circuit, and surely it was a disaster waiting to happen. Worse, nothing was labeled, so if a problem did occur, it would be difficult to trace its origin.

But that was then and this is now — the manager has recentralized the company's servers into the glass house. He has applied a disciplined approach to installing all equipment in organized, rack-mounted units, conditioning all power sources, labeling all cables and generally securing the whole environment. You can bet that his uptime rate has improved, as has his ability to locate and isolate problems quickly.

Oddly enough, that discipline was expected for the mainframe. Why isn't it second nature for networks, too? Somehow, when we decentralized computing, we forgot the lessons learned in the great glass house. Call it the PC mentality. After all, aren't networks just a bunch of PCs connected together?

It's time to face the fact that downtime is no longer acceptable to many enterprise network users. Yet the increasing complexity of networks makes it difficult to ensure absolute uptime. Why not join a group like the UUUG and find out what you need to know about providing continuous uptime for your network?

In this case, what you don't know can definitely hurt you.

You can reach the national office of UUUG at (212) 575-2275. There also are several regional chapters around the country. Join the group, share your war stories and learn from those who have already walked the path ahead of you. Get ready for the inevitable: uninterruptible uptime for your network.

Musthaler is vice president of research at Currid & Co., a Houston-based information technology consulting firm. She can be reached at (713) 789-5995 or via the Internet at 75300.2660@compuserve.com.

Should you limit employee access to non-work related information on the Internet?

Most organizations have acceptable-use policies for their computing and networking resources.

Similarly, an Internet use policy assures management that corporate resources are being used properly and productively in pursuit of the corporate mission. It also provides network managers with guidelines for allocating resources.

You basically have three options for managing Internet access: firewalls that provide a tight level of security on inbound and outbound traffic; Internet access and productivity management products, such as filtering, monitoring and usage reporting tools; and labeling, or content ratings, such as the proposed Platform for Internet Content Selection (PICS) system.

Organizations that use Internet access management tools are far less concerned with the content of the material employees access than with the time employees spend perusing it. They seek not to protect their employees from the content, but to ensure that their workers use the Internet solely for business purposes during business hours.

Nigel Spicer

A good Internet access management tool controls employee use of the Internet, including restricting access to unapproved resources. It allows a company to have multiple permission levels depending on employees' job functions. So a company doesn't have to unilaterally restrict access; it can provide access to those who need it, when they need it.

It also can report on use of the network and the Internet by users and groups to facilitate department billing and deployment of computing resources.

Indeed, for some organizations, the use of Internet access management tools may be the deciding factor in convincing management to provide World-Wide Web access to all employees. Of course, the question arises: Who decides what are acceptable business resources and for whom?

Vendors of Internet access management tools generally provide with their products a list of sites that companies may want to block. Companies can also restrict or allow additional sites depending on their own policies.

The PICS system depends on the development of labels, or content ratings, by third-party companies. You select the ratings services that mirror your values or industry interests.

Most employees will not abandon their business tasks in favor of 'Net surfing. However, even with the best intentions, it is possible to get sidetracked. Internet management tools that prohibit access to fun sites during business hours while allowing access to the required business resources assure management that company resources are being appropriately used for company business.

Assured that important organizational resources — company computers and employee productivity — have been protected, a company will be more, not less, likely to provide Internet access. That can only contribute positively to the free and frank exchange of ideas and information that is the Internet.

Spicer is president of Microsystems Software, Inc., a provider of Internet access management tools located in Framingham, Mass. He can be reached at (508) 879-9000 or via the Internet at nigels@microsys.com.

Internet users, long accustomed to having the world's information at their fingertips, may soon receive a rude awakening. The Platform for Internet Content Selection (PICS) — an industry group under the auspices of the World-Wide Web Consortium — is defining software standards that will enable on-line information to be rated for immoral, offensive or objectionable content and automatically denied to certain users. PICS includes most major on-line service providers — including America Online, CompuServe and Prodigy — as well as content suppliers, Web software vendors and advocacy groups.

What's disturbing about the PICS' work is that the group also intends to give corporate censors tools for denying their employees access to vast amounts of on-line information.

We're in danger of letting the current hysteria about on-line pornography kill the free exchange of ideas and information, which is what many of us hold most dear about the Internet.

Jim Kobielus

No one denies that employers have a right to control use of corporate computers and nets, but on-line access blocking is neither an appropriate nor feasible solution. Modern corporations must trust their employees' professionalism and better judgment in making wise use of office systems. 'Net surfing restrictions must be written into acceptable-use policies and communicated clearly to all staff.

Content rating and blocking schemes are valid in the abstract. However, rating mechanisms can only be effective on the Internet if they're adopted universally. It would be absurd to control access only with respect to sites that have implemented ratings systems when similar content is available at the drop of a URL from many unrated sites.

How does PICS propose to get operators of millions of Web sites to upgrade their server software and devote the resources necessary to rate and index on-line resources on a regular basis? Will Webmasters have to rate every scrap of information, not only on their own sites, but also on all linked sites? In a world where every virtual community has its own standards of offensive or frivolous content, what content provider can hope to be aware of and support all standards.

In the absence of universal ratings/enforcement mechanisms, one workaround is to design browsers that block access to all unrated sites, on the theory that they must be harboring something of minimal social value. But what intelligent user would agree to live in a cyberbubble that prevents him from accessing the bulk of on-line resources?

It's a big mistake to think that a management problem — cracking down on office goof-offs — can be solved with a technological quick fix. Institutionalized censorship should never be allowed to take root in cyberspace.

"Web of hate" generates record response

Our recent story about hate sites on the Web, along with a follow-up news story and editorial, generated a record number of letters. See page 51.

Kobielus, a contributing editor to Network World, *is a senior telecommunications analyst with LCC, L.L.C., an Arlington, Va.-based network design and engineering firm. He can be reached at (703) 807-5075 or via the Internet at kobielus_james@lccinc.com. The opinions expressed are his own.*

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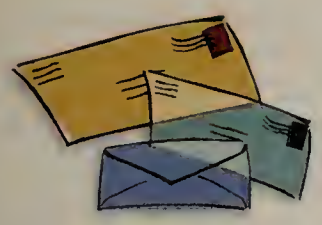


IN-BOX

Web of hate: Reader reaction

Our "Web of hate" story and related editorial in the Jan. 8 issue (pages 1 and 36), along with a follow-up news story and editorial in the Jan. 15 edition (pages 9 and 36), generated a record number of letters.

The articles, which spawned an avalanche of similar stories in the general press throughout the country, chronicled the growing number of hate groups setting up shop on the World-Wide Web and how other groups are responsiding to them.

Following is a representative sample of letters we've received in response, some of which have been edited for space. You can find these letters, as well as others we couldn't fit on these pages, on Network World Fusion.

I was sorry to see your recent detour into sensationalism. "Web of hate?" I thought I had picked up the *National Enquirer.* The objects of your horror are indefensible, but hardly worthy of attention in a technical magazine without a political agenda.

Perhaps your writer was confused about the difference between "available" and "visible." Web pages don't attack people; people who are interested must seek them out. Or perhaps your writer was confused by the difference between "widely available" and "widely believed." I doubt your readers place any more credibility in white separatists than they do in black separatists or Elvis sightings.

The whole world is "[turning] to the 'Net in droves," not just white separatists. Only the foolish believe the presence of a few misfits creates a "world of paranoia, hate and violence" on the 'Net or in society as a whole. Only the ignorant believe that censorship can survive in an information society. Those who would try to censor are no better than those they wish to silence.

Dave Watson
Systems engineer
Trident Data Systems
Los Angeles

I was very surprised to see "Web of hate," an excellent example of tabloid trash, in *Network World.* What's the problem — pornography, perversion and other wackos on the Web not worth your interest? Perhaps it's because your usual take on them is, "Oh gee, we just have to accept it because the Internet is just like, really free, and that would be like, uh, censorship, and that's just like, uh, really bad — you know?"

Have you run out of real industry news to report? This type of totally biased slash-and-burn commentary is best left to your garbage-mongering associates in the consumer news industry who spew this trash at us everyday from our newspapers, television and trashzines.

Get a grip, get a life and get back to your real work.

Paul Foote
Nashua, N.H.

Until I read your article "Web of hate," I had no idea of the actual locations of any of the hate group Web pages, nor had I seen any of them. My first impression was, "What is this type of material doing in a technical trade journal?" I was distressed to see that political correctness and the hysteria of control have finally begun to get a grip on the Internet in any capacity. I was equally distressed to see this type of material in an otherwise informative magazine.

In your follow-up article (Jan. 15), The Simon Wiesenthal Center's call to arms over Web content is more than just a little paranoid.

Groups such as Holocaust revisionists, Nazis and Communists are counter to the culture and spirit of America, but the Supreme Court has time and time again upheld their right to function and propagate information in the form of literature. (I do not support these groups in any way, shape or form, I would like to add.) If you don't like this subject matter, don't read it.

I become irate when I think that the first publicly accessible information exchange must fall prey to those who believe certain information is not good for people. Let me make up my own mind — at least until the free right to make up my mind about subject matter is removed by the government, media and special interest groups.

The Internet is growing at a rate faster than technology. As a result, the 'Net is slowing down, particularly on the socket representing World-Wide Web information exchange. Creating "Internet police" responsible for curbing so-called hate sites, smut sites or sites that don't present the current government view — either on the individual Internet service providers (ISP) or as a roving entity — will create a huge bottleneck. Forcing the ISPs to get involved in policing the Internet will result in the courts becoming overburdened with all types of frivolous lawsuits. I agree that hate exists; I don't agree that it is a new thing and that it is all of a sudden getting worse. The Internet is currently a free entity for information exchange. Let's keep it that way.

Steve Jardine
Scottsdale, Ariz.

Your article "Simon says no to Web hate sites" (Jan. 15) contains a statement that really disturbs me. In response to The Simon Wiesenthal Center's call for a code of ethics, the article states: "CompuServe immediately reacted, saying the place to start is with those that 'create the content,' rather than with those that simply provide access to it."

Well, CompuServe, I guess you should unrestrict all of the Web sites that deal with sexuality, pornography, Howard Stern, homosexuality and so forth — or do you draw the censorship line where you, acting as God, deem applicable?

I don't like to see hate supported on the Web, but I firmly believe in the concept of freedom of speech and thought. I don't believe in censorship, regardless of the source. Neither the source nor the transport method (get the drift, CompuServe?) should be censored.

Marshall Eisenberg
Sales development manager
Bay Networks, Inc.
Santa Clara, Calif.

I am very concerned that in your Jan. 15 article on so-called hate sites, you let pass a reference to "fundamentalism" in a context that implied that fundamentalists are hate groups.

The paragraph reads: "And there are various sites, such as The Hall of Shame, that cast a sarcastic eye toward hate sites." These were the reporter's own words. Then he quoted from the Hall of Shame site's own words, "a list of URLs made by fascists, fanatics, fundamentalists, conmen, hypocrites, profiteers and all-around net.cooks (sic)."

Your magazine thereby showed its approval of and agreement with labeling "fundamentalists" among those fostering hate. You did not mention whether you were referring to Islamic or Christian fundamentalists, or both, but I find either case insulting and offensive and, in fact, hateful.

To stereotype the religious community in this way should be out of bounds for any journalist. And, as a Christian, I do not expect to find slurs against my faith in a technical journal I read for professional information.

Phil Brown
Austin, Texas

Regarding your editorial "Free trade of ideas" (Jan. 8): I am astonished by your suggestion that readers discourage Internet service providers from hosting hate groups.

It is not the suggestion that astonishes me, since it is nothing more than an economic boycott, but the fact that you limit your suggestion to hate groups — what you called "white supremacists and other racists, Holocaust revisionists, et al."

Why not encourage such personal activism on a much wider scale? There are certainly many other kinds of ideas equally warped and poisonous being propagated on the 'Net.

Of course, when a religious or pro-family group tries to boycott sponsors of television programs that contain what they consider warped and poisonous ideas, they are met with howls of protest and cries of censorship. We wouldn't want to be confused with such folk, would we?

Meanwhile, I await the massive outpouring of protest and outrage against your proposal from the usual quarters. But I'm not holding my breath.

(These opinions are my own; I do not speak for my company.)

Jim Vishoot
Senior manager
Telematics International, Inc.
Ft. Lauderdale, Fla.

I agree with the position expressed in your editorial "Free trade of ideas." As the noble experiment of Prohibition showed, you can't make something ugly go away simply by making it illegal. Far more effective is the building of a social consensus against it. Such examples as the progress in civil rights and the gradual disappearance of smoking show how this can work.

In the article "Simon says no to Web hate sites," I do agree with Rabbi Cooper's view that the First Amendment protects publishers from having to publish material. However, it also protects publishers who choose to publish material. The cry of "censorship" starts — and should start — whenever some group tries to intimidate others who want to publish some material.

There's a separate issue about the "blind conduit" notion. As far as I'm concerned, added-value providers like CompuServe should be more than conduits. Right now, that's risky given a recent lawsuit where a company was held liable for the decisions it made specifically because it chose not to be a blind conduit. Clearly, that's an example of American legal excess. On the other hand, we also need blind conduit carriers, since otherwise there is no venue for free speech.

Paul Koning
Wilton, N.H.

Your editorial "Free trade of ideas" puts the responsibility for censorship right where it should be: on the shoulders of (in this case) parents.

Recently, friends of mine experienced the unfortunate situation of catching their teenage children viewing cyberporn. When we discussed the topic, the parents expressed their anger about the

Continued on page 52

The author replies:

I was startled to find just how effectively hate groups use the Web and how pervasive these sites have become. It is quite easy to find them by accident. And with more members learning HTML, other sites are sure to follow. Our readers are increasingly conducting business and communicating over the 'Net, and have a right to know what is happening in this virtual community.

—Doug Barney

Continued from page 51

availability of pornography on the Web. When I was asked how I handled the situation, my reply was simple: I am my children's gatekeeper. They are not allowed to spelunk on the Web without my supervision. Beyond that one restriction, they enjoy all the advantages of the Web and personal computing.
Michael Paciello
Senior usability engineer
Digital Equipment Corp.
Nashua, N.H.

Regarding your editorial "Web of hate: Part 2" (Jan. 15):

If we see a Web site as a collection of people with common or diverse views, we understand that, as in life, we'll find individuals or groups with which we agree or disagree. Fortunately, it is easier to avoid Web sites with which we disagree than people in our own real neighborhoods.

With tolerence for all as a goal, we should, as you say, "vote with our feet" when confronting disagreeable ideas on the 'Net. Those who object loudly to material on the 'Net are correct to do so, but we must remember free speech involves listening as well as talking.
Joe Bergman
Tobin Hall network supervisor
University of Massachusetts - Amherst

I am one of the old-time 'Net anarchists. I believe in no censorship or restriction of any kind. If you don't bring attention to these unsavory groups, they either stay small or go away.

If you bring them publicity by trying to ban them, you make two mistakes:

First, you give them attention, which is what they want. This gives some respect to their views because you deemed them worthy of debate. Second, you get them worked up and able to draw in more people. Most folks just ignore them, but if you argue and fight with them, it makes it easier for them to draw in others.

I love visiting the radical sites — it lets me know that everybody's not just like me. But the sites that people want to ban are so small and insignificant to anyone but crusaders that it's really best to ignore them. I've seen so many like this quietly go in the cybernight in just this way.
Michael Johnston
President
Michael's Music Service
Charlotte, N.C.

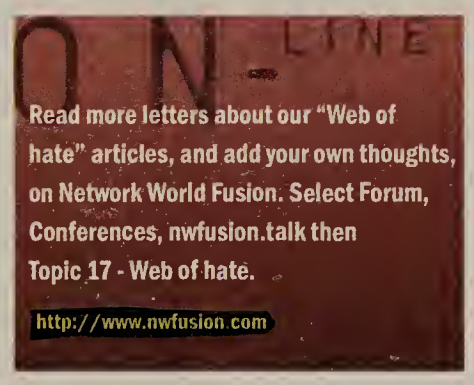
Your editorial on Web censorship is right on the mark. I, too, abhor some of the hate speech and raw sexual content contained on the Internet that has received more media attention than it deserves.

However, if an attempt is made to legislate behavior or otherwise restrict this type of activity, these efforts will only succeed in driving this drivel underground where it can become immensely more dangerous. There is something to be said for having these groups out in the open so that the public can see just how reprehensible they are.

Further, if you restrict their rights, can they then legitimately request that points of view with which they disagree, including such worthwhile groups as The Simon Wiesenthal Center, also be barred from airing their opinions?

It is indeed a fine line that we walk with rights of free speech and press, and I believe that as the 'Net gains widespread use and acceptance, groups like this will become so unusual that they will barely be noticed. Ignore the bigots and rabble-rousers and they'll go away.
Daniel Gonos
Telecommunications manager
Domino's Pizza
Ann Arbor, Mich.

There's a Russian proverb that says, "The devil enters by the backdoor." I agree with your editorial: Any effort to selectively curb who says what on the Web will open the door for even more pernicious problems.
Cole Thompson
Computer systems administrator
Gallagher Heffernan
San Francisco



I am against censorship on the Internet. We cannot block or prevent these hate sites from existing.

However, I wish a tool could be provided that would allow intelligent linking and give the destination site a choice as to how the information will be provided. For example, if the Ku Klux Klan can set up something that links its site to The National Jewish Center, then The National Jewish Center should be able to identify the source of the link request and provide an appropriate disclaimer, such as, "We are in no way related to the KKK site. You are welcome to browse our site but these are our recommendations . . ."
Truc Hoang
Albuquerque, N.M.

In the U.S., we cannot restrict the right of people to communicate their opinions on the Internet any more than we restrict their right to communicate through other media. We have already seen the problems that can occur when an organization tries to control the free exchange of ideas in the so-called "politically correct" environment at several of our universities.In the long run, it's far better to have a free exchange of ideas and opinions so that informed judgments can be made by the participants.
Fred Larkin
Arlington, Va.

It's a waste of time to talk about censorship of Web sites and responsibility of service providers. They are no different than cable TV channels, telephones, videotapes, magazines or books. People have to make an effort to access the Internet in the same way they have to sign up for cable or dial a 900 phone number. Nothing is shoved in their face, and if they don't like it, they don't have to look at it.

The voices for censorship are afraid the rest of the population is so weak-minded that we need to be protected from the truth as other people know it. Save us from the censors!
Laura Wallace
Network administrator
Mahlum & Nordfors McKinley Gordon
Seattle

While I subscribe to the concept of free speech, I believe that anything carried to the extreme is generally detrimental to some faction or group. Consideration for others must be taken into account, and some things are just (in my opinion) absolutely contrary to human decency.

These hate groups certainly have the right to believe in whatever perverse philosophy they want, but espousing this trash in a public forum and aiding the contamination of young minds is not providing a positive contribution to humanity. It appears that these misguided and psychopathic types are always the most vocal and use the laws to defend their position, as they are certainly entitled to. But a line must be drawn when free speech contributes to the demise of polite society. We can all fall onto the First Amendment as a reason to allow this to continue, but remember the story of Nero fiddling while Rome burned?
Robert Pickwoad
Computer engineer
Arizona Public Service Co.
Phoenix

As the Webmaster of the University of Virginia's Department of Electrical Engineering home pages, I would like to say that we allow student home pages to be linked from our home page, and we do not restrict their content. However, we do ask students to be "reasonable" when creating their pages. We place the following disclaimer on our pages:

"This list is provided as a courtesy to help people find, and find out about, one another. The contents of personal home pages are the responsibility of their owners, and the appearance of a page on this list does not constitute a university endorsement of that page."
Philip Wheeler
Computer systems senior engineer
University of Virginia
Charlottesville

I agree with the concept of freedom of speech. But there have to be some limits as to where and when that freedom of speech is exercised.

There are laws in the U.S. about inciting a riot or panic. There ought to be laws against hate speech, speech used for the sole purpose of angering others or provoking a violent response from others.

Hate comes in all forms. Some people react violently when others don't agree with their point of view. They then spout hateful messages in response. This is bad enough, but when these hateful messages are posted to multiple, unrelated newsgroups intentionally, then someone needs to take action. I believe that people have a right to say what they believe, but it must be done in an appropriate manner.

Service providers should respond to complaints of abuse and gross, blatant disregard for others using the 'Net. Those users who continue to post material contrary to the stated scope of a newsgroup should be dealt with in a manner that will curb that abuse. The abusers do not have to be censored, just censured.
Todd Pearce
Plano, Texas

More power to us

Your "Power Players" issue (Dec. 25/Jan. 1) is the best I've ever seen in the networking industry. As the guy who produced this industry's first "Top XX" list back in the '70s (for *Datamation*), I feel particularly qualified to comment. This is hard stuff to do right, and you've done it very, very well. Interesting. Readable. Powerful.
Richard McLaughlin
Senior partner
High Tech Advertising
Costa Mesa, Calif.

Wake-up call

Thanks to Dave Kearns for his insightful article on mismatched WinSocks (Jan. 8, page 28). This problem, however, goes much deeper. Both software and network providers seem to have their heads in the sand; they don't want to deal with the issues involved.

I installed a copy of Charles Schwab & Co., Inc.'s Street Smart 2.0 software. The only way one can use the software is through CompuServe. The CompuServe software wouldn't work with the Windows 95 WinSock.dll I needed to run Netscape on my Netcom account. The CompuServe technical support representative I spoke with had no idea what to do, wouldn't let me talk to a supervisor and refused to give me the names of management personnel.

In frustration, I cancelled my CompuServe account and have made arrangements to switch my Schwab account to Fidelity Investments. Fidelity's Fox software is DOS-based and uses a private network.

Voila! No WinSock problem. I am sure the loss of my accounts is only a drop in the bucket to these vendors, but they had better wake up soon before other users decide they're not going to put up with the effect on their bottom lines.
Virginia Bacon
Portola Valley, Calif.

Kearns replies: For what it's worth, the newest CompuServe Internet Dialer will work with WinSock.dll installed in its own directory, allowing you to keep the Win95 WinSock in the Windows directory for use with other applications.

SIZING UP

Buyer's Guide

Internet outsourcers

HERE'S HOW TO FIND THE FIRM THAT CAN HELP YOU BUILD YOUR INTERNET DREAM HOME.

By Mark Gibbs

It's a classic build-or-buy decision: Do you take on the huge commitment required to build a polished Internet site or hire someone to do it for you?

At first glance, it's tempting to take on the job yourself. After all, just about every article you read on the subject says how easy it is to establish an Internet presence. But when you take a closer look, you realize that doing anything more than connecting to the 'Net and putting up the most basic of World-Wide Web sites requires expertise you don't have on staff.

Seeing immense opportunity to turn a few quick bucks, literally hundreds of companies are now offering Internet outsourcing services to help you out. These companies range from giants such as AT&T to obscure wanna-bes working out of their garages.

There are benefits to teaming with an outsourcer. For instance, you won't need to hire TCP/IP experts to establish an Internet link and resolve conflicts between the 'Net and your environment. You also sidestep having to learn a flotilla of other Internet technologies, ranging from router configuration and troubleshooting to Domain Name Service management and security — not the kind of things you can pick up in your sleep. Furthermore, you won't have to worry about getting people who can effectively deal with Internet E-mail and file archives.

The Buyer's Guide chart on page 54 provides a representative sample of vendors in this market and the type of services they offer. *Network World* invited the big-name players and some smaller companiess that have been around for a few years and have an established clientele to participate. The goal was to form a cross section of vendors that will do most anything and those that specialize in a few services.

Any of these outsourcers, and perhaps many others, will be able to establish a solid and professional-looking Internet presence for you. However, the firm's sophistication, management capabilities and effectiveness will depend on its staffing, experience and background. These factors will determine whether your home on the Internet becomes an elaborate mansion with all the custom trimmings, a prefabricated bungalow or, if you don't choose wisely, a house of cards.

Continued on page 54

ED PATTON

FLYING SOLO?

If you'd rather go it alone on the Internet frontier, check out our review of **13 Internet firewalls** to make sure you keep your site safe. **Page 59.**

Network World TEST ALLIANCE

Continued from page 53

The larger outfits, such as AT&T, will offer as many services as they can — everything from creating Web page content and hosting a Web server at their site to taking care of your most advanced electronic mail and network management needs. Then there are firms such as CompuServe, Inc. that offer more limited services, such as Web hosting and page construction only. Others, such as graphics houses, restrict themselves to a specific service and will, for example, only design the look and feel of Web pages but not program the content.

NetworkWorld Fusion

You can view sites developed by vendors listed in the Buyer's Guide chart on page 54 by linking to http://www.nwfusion.com. You'll also find links to a variety of Internet outsourcer lists. Select NetRef then Product Reviews/Buyer's Guides.

While some companies claim to offer everything, it's unlikely you'll find one that has the best-of-breed offerings in all areas. The range of talents required to become everything to everybody is just too great for one company to master.

So you have got to practice due diligence in picking an outsourcer.

Perhaps the most troublesome decision in selecting an outsourcing partner is whether you want that firm to provide the required server hardware. You'll have to pragmatically assess your organization's capabilities and available resources to come to any conclusion.

If you don't have what it takes to keep the server in-house, it is vital to know whether the outsourcer understands security. Many outsourcing sites have very poor physical security, such as network cabling that can be easily accessed outside the building. Seeing such careless cabling should raise questions about the integrity of the firm's services.

Other areas of concern are whether the outsourcer uses vulnerable systems with weaknesses that have been noted in bulletins, such as those published by vendors or the Computer Emergency Response Team (CERT). The CERT was established in 1988 by the Defense Advanced Research Projects Agency following a famous worm attack that year. CERT bulletins notify users when a system weakness has been uncovered and provide some helpful hints. Bulletins can be accessed on the Internet at ftp://cert.org/pub/.

You should study whether the firm knows how to get these security tips and demonstrates an understanding of overall security issues.

You also need to understand whether the outsourcer has an Internet firewall and what the strategy is for using it. Homemade and public domain firewalls are a good start, but top-notch security demands professional solutions.

So ask how the outsourcer manages site security. For example, if your outsourcer allows you to attach your own Web server hardware to a network at its site, it is vital to know how the firm will control remote access to that machine and if it segregates traffic from others on the net.

Without these controls, an unauthorized logon to a machine on the outsourcer's network could result in someone loading a server with sniffer software that can monitor data traffic. Then the intruder could pluck lots of information — particularly names and passwords — if servers on the outsourcer's net aren't isolated from one another.

You will want a detailed description of the network architecture and a configuration diagram of the outsourcer's network. You should also get a list of equipment the company uses and its security policies.

Another consideration is whether the firm that hosts your server has a high-speed connection to the Internet to provide more than adequate response time to end users. Outsourcers will connect to the Internet in a variety of ways. At a minimum you'll want to know which way a firm links to the 'Net and how heavily loaded that circuit is (see graphic, page 56).

Top-notch outsourcers, such as BBN Planet Corp., will connect directly to the Internet backbones of one of the major telephone companies, such as MCI Communications Corp. or

Continued on page 56

Internet outsourcing service providers

Company	Service area	Web services						Other services								Help desk hours	
		On-site server hosting	Web server-based E-mail	Takes customer orders	Supports credit card payment	Usage statistics reporting	Page construction	E-mail account management	Listservers	E-mail autoresponders	FTP archives	Local newsgroups	Custom newsgroups	Security services	Network management	Monday-Friday	Weekends/Holidays
AT&T (800) 746-7846	National	✔	✔			✔	✔	✔		✔		✔		✔	✔	24 hours	24 hours
BBN Planet Corp. (617) 873-2905	National	✔	✔			✔				✔			✔	✔		24 hours	24 hours
CERFnet, Inc. (619) 455-3910	National	✔	✔			✔		✔			✔	✔	✔	✔		6:30 a.m.-6 p.m.	8 a.m.-5 p.m.
Channel 1, a service of Cybergate, Inc. (617) 864-0100	National	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		9 a.m.-5:30 p.m.	
CompuServe Network Services (800) 433-0389	National	✔				✔	✔							✔	✔	24 hours	24 hours
Digital Equipment Corp. (800) 344-4825	National	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	24 hours	24 hours
Global Enterprise Services, Inc. (800) 358-4437	International	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔		✔	✔	9 a.m.-8 p.m.	(1)
Global Internet Network Services (800) 682-5550	National	✔	✔	✔	✔	✔	✔	✔			✔			✔	✔	7 a.m.-7 p.m.	(1)
IBM Global Network/Advantis (800) 455-5056	International	✔	✔	✔	✔	✔	✔	✔			✔			✔	✔	24 hours	24 hours
Internet Direct, Inc. (800) 800-1743	National	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	24 hours	24 hours
InterNex Information Services, Inc. (408) 327-2388	Regional	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔		✔	✔	8 a.m.-8 p.m.	
MCI Communications Corp. (800) 955-6505	National	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	24 hours	24 hours
Northwest Nexus, Inc. (800) 539-3505	Regional	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		8 a.m.-8 p.m.	10 a.m.-3 p.m. (2)
UUNET Technologies, Inc. (800) 488-6384	National	✔	✔	✔	✔	✔	✔	✔			✔			✔		8 a.m.-8 p.m.	(1)

Product names highlighted in color were selected for the Short List.

Chart compiled by Kathy Scott

Footnotes:

(1) After-hours support from network operations center.

(2) No help desk on holidays.

NetworkWorld Short LIST

Internet outsourcing service providers

The Short List highlights companies Network World *recommends you examine closely when choosing an Internet outsourcing service provider. While there are hundreds of providers around, only those listed in the Buyer's Guide chart on this page were considered for this Short List. Moreover, the vendors named here fall into one of the two camps outlined below. Vendors in each camp meet different user needs and come from different backgrounds. You may find an outsourcer not listed in the chart will better suit your needs.*

Traditional outsourcers

Digital Equipment Corp. and **MCI Communications Corp.** lead this group of vendors. Both have gained market credibility by offering top-end outsourcing services for other functions such as private networking.

These outsourcers will build you a solid Internet presence, establishing file archives and World-Wide Web and traditional electronic mail services. They will also provide server hardware and manage your net.

But while these outsourcers can offer all of the key services, you'll find they may not be the best of breed in everything they do. Indeed, many of the traditional outsourcers getting into the Internet game subcontract part of their work to other companies.

Advanced Internet access providers

Global Enterprise Services, Inc. and **UUNET Technologies, Inc.** fit at the top of this category. Both are now providing more than simple Internet access. Global Enterprises, which owns and operates JvNCnet, is expanding into the international market and has teamed with a number of equipment suppliers to offer customers one-stop shopping for Internet access circuits, equipment and consulting. UUNET now offers advanced Web hosting and services such as order-taking and credit card processing. UUNET's relationship with Microsoft Corp. and its involvement with the Microsoft Network gives it a lot of credibility in this market.

Honorable mention

AT&T and **BBN Planet Corp.** are dark horses. The firms have agreed to work together to offer Internet outsourcing services. AT&T has strong networking knowledge and BBN Planet is among the more established Internet access providers that is branching out to offer Web hosting, page creation and other consulting services. If the two firms can work out the kinks of their relationship, they could become a real force in the market.

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Continued from page 54

Sprint Corp. This ensures that your Web pages, file archives and other information can be accessed via high-speed links with few intermediate systems or hops.

Other companies will connect first to an Internet access provider, which in turn will connect to a high-speed Internet backbone circuit. This type of connection introduces more hops because your traffic passes through more equipment. Keeping the number of hops low is important because each one introduces delay that can degrade response time.

Load up the content

If you want to build a solid Web presense, there is plenty more to consider.

The biggest problem is in designing the look and feel of the site. This is something that can be done in-house but not without training. Homemade Web pages tend to look like, well, homemade Web pages. The only way around this is to have the most talented programmers and designers, but they are in short supply and don't come cheap.

To get the compelling look you want, make sure an outsourcer can show you examples of similar work done for other clients. Furthermore, the outsourcer should provide you with a credible design and development strategy before fully implementing the site. This strategy should address not only initial construction, but also site modification and expansion.

Hiring an outsourcer with Web-site design expertise is a good idea, even if you only use that outfit to get started. Once Web page style and design techniques have been established, then you would have the option to take over the process of updating and expanding the site in-house.

When evaluating designers, looking at their past work is probably the best way to gauge them. There are ways to make sure a Web site is well constructed. For example, you don't want to overload a page with useless graphics. If you want a home page with a map that lets users hyperlink to other pages by clicking on icons, make sure it is very clear to the end user which icon is used to jump to which page (*NW*, Dec. 18, 1995, page 36.)

The bottom line here is to look for demonstrable experience and stategic thinking — attributes that should be the basic qualities of an outsourcer anyway.

If you are planning on an Internet presence that seriously promotes your organization or, even more critically, one that is intended to make money, nice-looking pages are only part of the equation. You are also going to need support.

This is an area where using an outsourcer may be problematic. Operations support is rarely done on a 24-hour, seven-day-a-week basis, which has quite obvious implications for uptime. Many firms do provide a help desk to answer end-user calls around the clock, but technicians often have to be paged when problems are detected.

A related issue is the outsourcer's experience with support. Most of them are very new organizations, and their staffing tends to reflect that.

Support winds its way into network management and reliability issues. You'd expect prospective Internet outsourcers would offer both proactive and reactive management. But in general, proactive management is still a novelty among outsourcers, while reactive management is often sketchy.

For example, it would not be unusual if you discover your Internet link is down before your outsourcer does. If you are planning a major outsourcing deal, it is vital to ask for uptime records and question how long the typical outage lasts. And it wouldn't hurt to ask for references that can verify the outsourcer's records. MCI and AT&T will obviously offer the best uptime because that is their core business.

It is particularly revealing when you ask what software package an outsourcer uses for network management and get hemming and hawing as an answer. This indicates that the outsourcer probably lacks the sophistication required to provide good management.

The better outsourcers will respond with definite answers and will be using top-end network management systems such as IBM's NetView. They also will be able to show you a trouble-ticketing system that supports their management efforts. AT&T, Digital Equipment Corp., IBM Global Network/Advantis and Global Enterprise Services, Inc. will all provide good answers.

The basics

Despite all the hype, the Web is not the only useful Internet tool, and many outsourcers know that. Just about all outsourcers will offer basic E-mail account management services, but many fall short when it comes to extended services such as autoresponders.

An autoresponder — or "bot" as they are sometimes called — is an E-mail enhancement that shoots out an automatic reply to incoming mail messages. The White House uses an autoresponder to handle mail that is received at president@whitehouse.gov. This bot sends a form letter to acknowledge receipt of mail and tell the sender that it has been forwarded to a secretary.

More advanced bots allow for interpretation of the subject line or body text of a message and then generate an appropriate response, sending out information about a particular product, for example. Even files can be placed in and retrieved from archives managed by bots. An outsourcer's programming abilities will determine how sophisticated an autoresponder can get.

In some businesses, being able to offer file archives may be crucial. Whenever distribution of bulk data or program files is a routine requirement, a public file archive can be a huge cost savings.

Many outsourcers offer file archive services, but the best ones will have systems capable of supporting the heavy loads you expect your Internet presence to generate, provide detailed activity reports and have a server capable of supporting a large number of simultaneous connections on a fast link. MCI, Channel 1, Digital and InterNex Information Services, Inc. will do this.

On the bottom line

For many of you, the objective of establishing an Internet presence, including a Web site, is electronic commerce. To achieve success in this endeavor requires a secure server, which most serious outsourcers offer as a premium service.

Beyond that, there's the requirement for an outsourcer to take on-line orders for your product or service, process credit card transactions and integrate databases with Web servers. This is an area where there is little consistency among providers. It would be ideal if an outsourcer had some kind of business process design experience to improve these services, but such expertise is rare in the current market.

Even with some of the shortcomings in this immature market, it is more often worth outsourcing Internet services than not. But make sure you plan on micromanaging your outsourcer at first and then establishing regular benchmarks to make sure your partner remains up to snuff (see story, this page).

Also, be careful to make sure an outsourcer's approach to security, support and service is consistent with your objectives and way of doing business.

If you find the right outsourcer, you may well save your organization a ton of money and get an effective Internet presence before your competition does. Of course, it wouldn't hurt if your competition decided to go it alone.

Gibbs is a consultant and writer based in Ventura, Calif. He can be reached via the Internet at mgibbs@gibbs.com or by phone at (805) 644-4999.

How to make sure you're well connected

To ensure you pick an outsourcer with the right type of Internet access, ask these questions:

- Does the outsourcer connect directly to a major Internet backbone or indirectly via another access provider?
- What connection speed is used?
- Does the outsourcer have backup connections, even low-speed ones, to take over should the main link fail?
- Does the company have suitable routers to meet the demands you will make of its systems? To ascertain this, ask who makes the router, what model it is, what its tested performance figure is and how expandable it is.
- Does the outsourcer have replacement equipment and how long will it take to cut over to it following a failure? Moreover, does the company have an effective recovery plan?
- How much of the Internet access capacity is tied up by a committed information rate and can the provider actually honor that rate?

Avoid throwing money into the outsourcing black hole

Once you select an outsourcer, you begin a working relationship that needs to be managed. The question is, how much effort do you need to put into making sure the relationship is operating correctly?

A common technique is to micromanage the outsourcer, looking over the shoulders of the staff at the hired firm as it carries out work for you. Many relationships start this way. Client companies want to make sure the outsourcer is up to snuff and will keep close eyes on their strategic partner.

Problems crop up when clients forget to draw away as the relationship successfully matures. The end result is that those client firms never realize many of outsourcing's cash saving benefits and can, in fact, wind up shelling out more money to manage what should be a mechanical, routine process. Essentially, a company that fails to stop micromanaging is wasting money.

The key to avoiding this catch-22 is to benchmark an outsourcer's service. Establish acceptable service levels and make sure there is a way to quantifiably measure that the service level is met. You can use systems monitoring and other forms of service measurement tools to make sure benchmarks are met.

For example, if the outsourcer supplies regular reports of uptime, use of your services and analysis of access patterns that can show which of your Web pages or other Internet resources are accessed the most, you can begin to quantify the value of the site.

Without this kind of information, the relationship will remain a service black hole and you'll have no idea what is going on inside.

The strategic plan here is to specify what kind of data and site-usage analysis you require and review those reports regularly.

— Mark Gibbs

BY INVITE ONLY

Network World invited 30 vendors to submit information for this Buyer's Guide. Heavyweight access providers Advanced Network and Services, Inc. and Performance Systems International, Inc. were among those who declined without offering a reason. Sprint Corp. did not supply data for its current services, saying it will introduce much-improved offerings shortly after publication.

Feature

TAKING IBM'S ATM PULSE

The market is soft and the competition is fierce, but the gig isn't up yet.

By Charles Bruno

Flashback: In July 1993, at IBM's first rollout of Asynchronous Transfer Mode products, CEO Louis Gerstner boldly predicts that, over the next 15 years, ATM will be as significant as the System/370 mainframe line that has been IBM's cash cow. During an internal IBM technology assessment late that same year, Gerstner crowns ATM as one of three strategic initiatives for the company.

Back to reality. IBM's ATM strategy today hold lots of promise, but the vendor has won little market share in key sectors where demand is perking up, such as workgroup and campus ATM switches. Furthermore, while IBM is promising to deliver later this year advanced capabilities to ferry SNA data over ATM nets, it will likely will be preempted by rival Cisco Systems, Inc.

Nobody is saying Gerstner has been proven wrong, although some sources say IBM had hoped to reel in $2 billion in ATM sales by now. But with demand for ATM products soft (see story, this page), IBM instead is scrambling to play up the importance of Ethernet and token-ring switching.

"We did put a lot of emphasis on ATM switching," says Barbara Leonard, program manager of ATM market planning in IBM's Networking Hardware Division. "But switching has always been at the heart of our message as a core building block, while ATM is a core competency."

The company resells a token-ring switch manufactured by Centillion Networks, Inc. and markets two Ethernet switches, one from Bay Networks, Inc. and another developed by Kalpana, Inc., the Ethernet switch company Cisco snatched up before IBM could.

Even if IBM can successfully tap into the LAN switching revenue vein, it still must address some thorny issues on the ATM side. While analysts say IBM has a strong switching story to tell, they also say the company hasn't clarified how it will help large-scale router users transition to ATM.

Toward that end, IBM last fall announced its Switched Virtual Network (SVN) plan, which defines the role of ATM in campus nets. Key to the plan is IBM's Multiprotocol Switched Services (MSS) software, which is intended to push route calculations to the far reaches of the network, obviating the need for large backbone routers and ensuring a place for ATM switching as the sole backbone fabric.

David Abensour expects users will warm to IBM's ideas about distributed routing and 25M bit/sec ATM.

"It makes sense to distribute routing this way," says Daniel Abensour, IBM's program director of ATM market development. "Instead of forcing you to buy a big expensive router, I provide you with the same function and performance by distributing it."

IBM also faces a tough challenge at the low end of the ATM market where it has attempted to establish 25M bit/sec ATM as a viable desktop connectivity option. Despite its technical merits, low-speed ATM is flatout losing the desktop battle to fast Ethernet, which is less expensive and does not force users to come up to speed on ATM technology from a support and management perspective.

Abensour says users will warm up to 25M bit/sec ATM because it will vastly simplify the administrative adds, moves and changes that bury so many IS staffs.

Thomas Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy, says 25M bit/sec ATM provides a reason to empower end users with ATM. "If there's no reason to extend ATM to the desktop, managers will be under enormous pressure to explain why they want to move to ATM."

Another factor that could slow IBM's ATM conquest is the snail's pace of standardization in such places as the ATM Forum. "Standards haven't gelled as fast as IBM would like," says Rick Malone, a principal with Vertical Systems Group, a Dedham, Mass.-based consultancy.

Frank Dzubeck, president of Communications Network Architects, Inc. a consultancy in Washington,D.C. agrees, adding the lack of standards has inhibited IBM in delivering planned functions, such as the ability to support multiprotocol traffic over ATM nets. Now it will have to provide such functions on its own and risk being labeled proprietary.

The Holey Grail

Another chief hole to fill in IBM's ATM plan is enabling legacy SNA data to travel across ATM networkss.

IBM now offers LAN emulation software for its ATM switches that lets LAN-attached workstations conceal 3270 sessions. Abensour notes the software also lets the switches communicate with traditional routers using the Internet Gateway Routing Protocol or Open Shortest Path First protocols.

But analysts say that approach is far from perfect because it creates additional latency that can impair performance, potentially even to the point of timing out SNA sessions.

That, in fact, may be one of the rea-

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MORE ON Network World Fusion

http://www.fusion.com

- Analysis of IBM and competing ATM strategies from CIMI's Thomas Nolle.
- IBM's lineup of currently available ATM products.
- A summary of IBM's Switched Virtual Network architecture and a user testimonial from Chrysler.

From the main menu, select NetRef, Technology Resources then Broadband.

ATM SPUTTERS WHILE LAN SWITCHING MARKET HEATS UP

If the adage is true that there's strength in numbers, then the market for LAN switching is muscling up and the ATM product sector remains pretty weak.

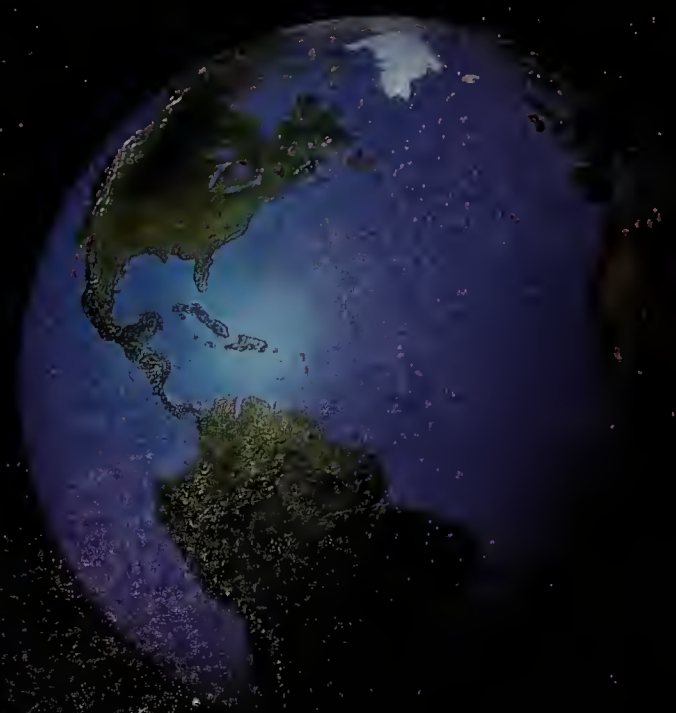
According to market research firm International Data Corp. (IDC) in Framingham, Mass., Asynchronous Transfer Mode port shipments for LAN workgroup switches grew from just 19,000 in 1994 to about 80,000 during 1995.

However, that growth pales against demand for Ethernet switching products. IDC says vendors shipped 412,000 LAN switch ports in 1994, while demand ballooned to more than two million ports last year. IDC expects vendors to ship four million Ethernet and token-ring ports this year.

With IDC predictions pegging 200,000 ATM-based LAN switch ports for 1996, the evidence indicates you "won't see significant ATM activity until 1997 or later," says Esmerelda Silva, an IDC LAN analyst.

On the 25M bit/sec ATM adapter side, even if shipments double over the next five years, ATM will wind up with less than 5% of total network interface card (NIC) shipments, says Mark Leary, IDC's director of LANs. By contrast, he adds, 100Base-T has grown from single percentage points a few years ago to account for 25% of all NIC shipments in 1995.

— Charles Bruno



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Circle Reader Service #78

A flurry of FIREWALLS

13 products to keep nets out of trouble

By Joel Snyder

An Internet firewall is like a newly divorced person: It's happy to be out on the network but won't let anybody get too close. In this day and age, you'll want to run a background check before you enter a relationship with one of these devices, and that's just what we did, checking out 13 products designed to control access to TCP/IP networks.

Products from vendors Livingston Enterprises, Inc. and Network Systems Corp. (NSC) excel at low-end, router-based firewalls for sites with simple security policies.

If you want to tinker with their insides, you'll be most interested in firewalls from Trusted Information Systems, Inc. (TIS) and Network-1 Software and Technology, Inc. These products are the ultimate in do-it-yourself kits.

Those of you who want an easy-to-configure product will be happiest with systems from Digital Equipment Corp. and CheckPoint Software Technologies, Ltd. CheckPoint is also a clear leader in managing multiple firewalls from a single interface and mixing packet filtering and application proxying technologies.

Border Network Technologies, Inc. provides the most complete all-in-one solution, a combination firewall and Internet server that kills many birds with a single box.

The application proxy firewall from Milkyway Networks Corp. showed the most innovative features, while Harris Computer Systems Corp., IBM, Secure Computing Corp. and SOS Corp. all turned in credible results.

For high-powered and speedy network address translation (NAT), Network Translation, Inc. managed to combine NAT and some firewall features into a powerful and easy-to-configure package.

In our last review of firewalls (*NW*, July 31, 1995, page 1), we found products that fit into textbook categories of packet filter, circuit gateway or application proxy. (For a more complete discussion of these categories, see the related stories on Network World Fusion.) Today, among products we looked at that were introduced or significantly revised since then, almost all are a hybrid of different firewall technologies and techniques.

Firewall routers

The combination router/firewall systems built into Livingston's Firewall IRX and NSC's The Security Router are primarily network routers that also include firewall functionality. Both of these augment the functions of simple routers by providing a way to log security-related information such as attacks to a local host. These products can also do limited filtering on other protocols. Livingston's Firewall IRX is limited to NetWare's IPX protocol, while NSC's Security Router can also handle AppleTalk, DECnet, XNS and VINES.

Firewall IRX is limited to filtering and monitoring network traffic, while The Security Router also provides secure IP tunnels.

The main distinguishing characteristic of these two products is their lack of state information; that is, they cannot decide to pass or drop traffic flowing through them based on past information. This restricts the complexity and power of the security policies these products can support, particularly with connectionless protocols such as User Datagram Protocol (UDP).

Firewalls also need state information to work with certain TCP protocols, such as File Transfer Protocol (FTP), that use two connections for data transfer. Firewall IRX and The Security Router examine each packet individually without any knowledge of packets that have been seen before. For example, it isn't possible to permit Domain Naming System (DNS) responses — which use connectionless UDP — to pass through the firewall only in response to DNS queries. If you're making heavy use of UDP-based services, such as Network File System (NFS), that you want to extend into the Internet, a stateless firewall won't work for you.

A variation on the router-as-firewall approach is an innovative firewall from Network-I Software and Technology. FireWall/Plus does not route packets; instead, it bridges them across two Ethernet interfaces and appears invisible to any higher level protocols. FireWall/Plus examines each Ethernet frame it receives and decides to pass or drop the frame based on content in the frame itself — such as frame type, media access control address or subfield, or length — or in higher level protocol data in the frame.

FireWall/Plus can be used for simple filtering of non-TCP/IP protocols but has the greatest utility for protocols that operate on top of IP because it includes prewritten rules for most IP-based protocols and security scenarios. FireWall/Plus handles not just traditional TCP and UDP but also other protocols that run over IP, such as the Open Shortest Path First routing protocol. FireWall/Plus can also maintain some types of state information to securely handle protocols such as DNS, NFS and FTP.

Private Internet Exchange (PIX) from Network Translation is a special type of packet-filtering router. It performs NAT and also has many security features built in. PIX helps organizations hide their internal IP addresses. PIX security features include some state information for protocols such as FTP, rules based on

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HOW THEY STACK UP

Product	Flexibility	Reporting, logging and alarms features	Management interface	Price/ performance
BorderWare Firewall Server	★★★	★★	★★★★	★★★
Firewall-1	★★★★	★★	★★★★	★★
Firewall for Unix	★★	★★★½	★★★★	★★★
CyberGuard Firewall	★★★	★★★	★★	★
Internet Connection Secured Network Gateway	★★★½	★★½	★★★	★★
Firewall IRX	★★	★	★★★	★★★½
Black Hole	★★★½	★★	★★★	★★
FireWall/Plus	★★	★★	★★	★★★
The Security Router	★½	★	★★	★★
Private Internet Exchange	★½	★	★★★	★★½
Sidewinder	★★½	★★★	★½	★
Brimstone Firewall Package	★★★	★★½	★½	★
Gauntlet Internet Firewall	★★½	★★½	★★	★★★

★★★★ = Outstanding ★★★ = Good ★★ = Adequate ★ = Deficient

Continued from page 59

TCP/IP protocol flavor — such as Telnet, Simple Mail Transfer Protocol or Network News Transport Protocol (NNTP) — and IP tunneling.

Flexibility of filters

CheckPoint's Firewall-1, Harris' CyberGuard Firewall and IBM's Internet Connection Secured Network Gateway (SNG) use a combination of techniques, including application proxies, circuit-level gateways and simple IP-based packet filters to implement a network security policy. These three products allow network managers the greatest flexibility to support a completely open internal environment with no software changes on client systems.

Because of their concentration on packet filtering techniques, Firewall-1, CyberGuard and SNG are strongest in that area, although they all support either application proxies, circuit gateways or both.

TIS' Gauntlet Internet Firewall comes from a company with a long history of firewall research. Gauntlet includes the second generation of TIS' free tool kit with a simple integrated administrative user interface and other proprietary tools. TIS is unique in providing full source code with its software.

SOS' Brimstone Firewall Package is more a collection of public tools than original software, although SOS does add some proprietary pieces, most notably in the user interface and monitoring areas. SOS' main contribution has been to collect, package, document and certify the products in its firewall. However, its tool kit approach encourages network managers to modify the firewall.

If you don't want to learn the ins and outs of Unix or network security and safe firewall configuration, check out Milkyway's Black Hole, Digital's Firewall for Unix, Secure Computing's Sidewinder and Border's BorderWare Firewall Server.

These products all simplify the task of building a firewall by reducing the possible options. They depend on application-level proxies and circuit gateways to lock down the most commonly used TCP/IP applications. Other limitations have been put in place to simplify the administrative user interface. For example, all but Milkyway's Black Hole strictly limit the number of IP interfaces (usually Ethernet cards) supported. This in turn significantly simplifies the user interface.

These products also link other common system management tasks, such as backups, reporting and logging, and system configuration into a single user interface, freeing you, in principle, from having to descend to the squirrelly passageways of the Unix command line.

Interfaces and orientation

The largest market for firewalls is in protecting corporate networks from public networks such as the Internet. An Internet-oriented firewall typically

Continued on page 62

NetResults

Product	Vendor	Price	Product description	Interfaces	Services on firewall	Services through firewall	Encrypted IP tunneling
BorderWare Firewall Server	Border Network Technologies, Inc. (416) 368-7157, (800) 334-8195	$11,000	Application-level proxy plus Internet server software	2 or 3 LAN	FTP, Gopher, Web, News, POP, SMTP, Telnet, DNS	IP-based outgoing access; authentication-based incoming access using proxies	No
Firewall-1	Checkpoint Software Technologies, Ltd. (800) 429-4391, (617) 859-9051	$4,990 to $39,900	Stateful packet filter software plus proxies	2 or more LAN	Discouraged	Transparent using packet filter, or authenticate to open temporary IP "hole,"or per-service authentication	Yes
Firewall for Unix	Digital Equipment Corp. (800) 344-4825	$10,000	Application-level gateway software	2 LAN	DNS, mail proxy	Proxy access for normal TCP-based services; no UDP	Yes, add-on product
CyberGuard Firewall	Harris Computer Systems Corp. (800) 666-4544, (954) 977-5513	$24,995	Packet filter and application proxy software on secure Unix hardware platform	2 LAN	SMTP, dual DNS	Packet filter rules to get through firewall; Telnet, SMTP and FTP application proxies (HTTP/NNTP in beta)	Yes
Internet Connection Secured Network Gateway	IBM (800) 426-3333	$9,999	Combination packet filter software, SOCKS proxy	2 or more LAN	DNS, mail	Proxy access using SOCKS or direct access with packet filter; can use FTP or Telnet application proxy	Yes
Firewall IRX	Livingston Enterprises, Inc. (800) 458-9966, (510) 426-0770	$3,195	Router with heavy-duty firewall features based on packet filters	2 LAN, 1 WAN	None	IP; IPX can be routed, but not filtered	No
Black Hole	Milkyway Networks Corp. (613) 596-5549	$2,900 to $20,500	Application-level gateway software	2 or more LAN	Mail proxy	Proxy access through firewall uses per-IP temporary holes (unless rules allow direct access); can telnet to firewall or use transparent proxy access; no UDP	No
FireWall/Plus	Network-1 Software and Technology, Inc. (800) 638-9751, (212) 293-3068	$11,900	Packet filtering stateful bridge	Only 2 LAN	None	All LAN protocols can be filtered	No
The Security Router	Network Systems Corp. (612) 424-4888	$11,995	Router with heavy-duty firewall features based on packet filters	2 or more LAN and WAN	None	All IP-based, as well as IPX, DECnet and LAN bridging	Yes
Private Internet Exchange	Network Translation, Inc. (415) 494-6387	$8,995 to $39,995	Network Address Translator hardware with firewall features	2 LAN	None	TCP and UDP	Yes
Sidewinder	Secure Computing Corp. (800) 692-5625, (612) 628-2700	$30,000	Application-level gateway software and hardware	2 LAN	Multiple Web, FTP, DNS and mail servers	Proxy access for normal TCP and UDP based services	No
Firewall Package Brimstone	SOS Corp. (800) 767-8649, (212) 686-5700	$15,000 to $25,000	Combination packet filter software, SOCKS proxy	2 or more LAN	Discouraged	Proxy access using SOCKS or direct access with packet filter; can use FTP or Telnet application proxy	No
Gauntlet Internet Firewall	Trusted Information Systems, Inc. (301) 527-9555	$15,000 (hardware and software), $11,500 (software only)	Application-level gateway	Only 2 LAN	DNS and mail; discouraged	Proxy access through firewall uses either authentication or IP-based automatic authorization; no UDP	No

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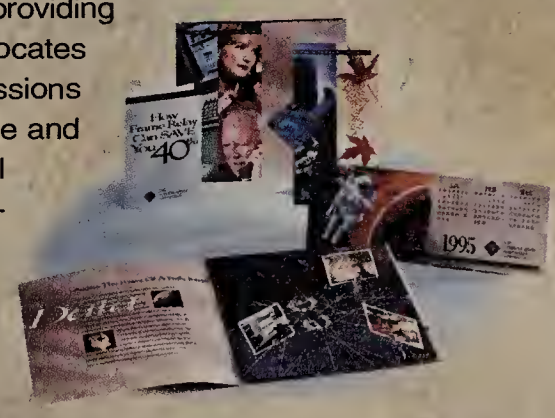

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has two LAN interfaces, one for the insecure side (sometimes called "dirty" or "red") of the network and one for the secure side (sometimes called "clean" or "blue"). All of the firewalls we looked at support at least two LAN interfaces; a few can support only two.

A restricted configuration with only two interfaces has a big advantage for a part-time security manager: The user interface can be very explicit about what is being allowed and what is being filtered. For example, in Network-1's FireWall/Plus, the inside network is shown with an angel icon, while the outside network is shown as a devil. Digital's Firewall for Unix, Secure Computing's Sidewinder, Network Translation's PIX, TIS' Gauntlet and Harris' CyberGuard share the same configuration restriction: two interfaces, with a heavy orientation toward Internet environments.

Border's BorderWare allows three interfaces, but with the same strictly defined roles: one is dirty and insecure; one is clean and internal; and one is for Internet-accessible servers that are not to be trusted, a subnet often called a demilitarized zone or a lobby.

For more complex environments with multiple firewalls, organizations, LANs or other webs of trust and distrust, two interfaces are not sufficient. The problem with more interfaces, of course, is that more complex management interface and configuration options offer greater opportunities to build a firewall with other-than-intended security policies.

Milkyway's Black Hole, IBM's SNG, CheckPoint's Firewall-I and SOS' Brimstone all support multiple interfaces, all but IBM on a SPARC platform.

Firewall-1's multiple-interface philosophy extends even further than the limits of a single hardware platform. Its administrative user interface lets a set of Firewall-1 systems and routers with many LAN and WAN interfaces be managed as a single entity with a single security policy and logging point. Brimstone provides a similar, although less comprehensive, capability.

Getting out through the firewall

Each firewall we tested has a slightly different way of handling access through the firewall. In general, external access to internal services is simply turned off; the firewall acts as a one-way valve, letting users inside originate traffic going out but preventing any outside traffic from getting in. Some firewalls provide special holes that allow particular systems on the outside to connect to particular systems on the inside, such as an external NNTP feed to an internal Usenet news server.

If all you want is a one-way valve, then almost any firewall will support your security policy. If you have a more complex security policy, you need to be a little more discriminating.

We divided the products into two rough categories: ones that are fundamentally IP address-based and ones that are fundamentally user authentication-based. Products in the first category generally care most about what IP address a particular user is coming from and don't have strict authentication requirements. Products in the second category keep a strict tie between users and access through the firewall and are generally considered to be harder for illegitimate users to get around. There are also hybrid products that do a little of both or mix multiple techniques; these tend to be the most attractive. (See Network World Fusion for a related story, "Authentication methods.")

Digital's Firewall for Unix and Border's BorderWare have the most restrictive access requirements: All authenticated access must use a onetime password mechanism. For example, if you want to give vendors temporary access through your firewall to diagnose a problem, you have to either set them up with a handheld token or have them call while someone who has a token can generate the proper response to the onetime password challenge. All the other authenticating firewall vendors also allow the less secure reusable passwords.

If your policy distrusts all outsiders and trusts most insiders, then IP-based filtering may be sufficient.

If your policy distrusts all outsiders and trusts most insiders, then IP-based filtering may be sufficient. It is nonintrusive, so users will see little, if any, change in how they use the Internet. For traffic originating from inside your network, this kind of filtering works pretty well.

IP-based filtering for outside users who wish to come into your network is another story; this is asking for trouble. As the Internet is security-free, no IP addresses can be trusted because they can be easily changed or spoofed. User authentication doesn't necessarily help, since a malicious attacker could conceivably "hijack" an existing TCP session, given the right circumstances and access.

Products that have no user-based authentication and rely on IP addresses — along with other criteria, such as service requested — to decide whether to allow traffic through the firewall include the routers we tested: Livingston's Firewall IRX, NSC's Security Router, Network Translation's PIX and Network-1's FireWall/Plus.

Digital's Firewall for Unix and Border's BorderWare are slight variations on this theme: All internal users are filtered based on IP address when sending outgoing traffic, and external users attempting to get in must be authenticated using a onetime password scheme.

Secure Computing's Sidewinder has a more limited and obscure approach. Sidewinder filters based on IP address but can use authentication for traffic originating from World-Wide Web browsers, such as Netscape Communications Corp.'s Netscape Navigator.

Other products let a user poke a temporary hole for a particular IP address for some period of time. For example, if you want to establish a telnet connection through the firewall, you must first authenticate yourself with a user name and password to the firewall itself. Once the firewall sees a valid user name and password coming from a particular IP address, it allows access.

The best example of this technique is Milkyway's Black Hole. Proxies built into Black Hole detect unauthorized traffic and request authentication before letting the traffic pass through. This is particularly nice for protocols such as HyperText Transfer Protocol (HTTP) and Gopher because the firewall authentication is relatively nonintrusive. As an alternative to using semitransparent authentication, users could specifically telnet to the firewall to open up their hole (and to later close it).

When a tighter handle is necessary, firewalls such as TIS' Gauntlet and SOS' Brimstone require authentication for each and every TCP access through the firewall. This means that each telnet or FTP command stops at the firewall for a user name and password before being passed through. Gauntlet can also operate in transparent mode, which doesn't require authentication by internal users.

This model runs into a problem with protocols such as HTTP, which can open up hundreds of TCP sessions as users click from page to page. Authenticating each of those sessions would be impractical, so the alternatives offered are to either allow such traffic unfettered and unauthenticated, or simply disallow all such sessions.

IBM's SNG, CheckPoint's Firewall-1 and Harris' CyberGuard are all hybrid systems that allow a combination of techniques. All offer IP-based filtering, as well as per-connection authentication for telnet and FTP sessions. Firewall-1 also allows authenticated temporary holes such as those provided by Black Hole, although the technique is less flexible and not as well integrated.

Incoming access to network

Continued on page 64

Is it a firewall or a server?

Many of the firewalls we tested also include Internet service software, such as File Transfer Protocol (FTP) or World-Wide Web servers. All but the router-based firewalls from Livingston Enterprises, Inc., Network Systems Corp. (NSC), Network Translation, Inc. and Network-1 Software and Technology, Inc. are based on the Unix operating system, so adding public domain (or proprietary) service software is not difficult.

If you want an all-in-one solution to Internet connection needs. A single box can run not just the security application, but FTP, NNTP, SMTP and POP, Domain Naming Service (DNS), Web and Gopher. Border Network Technologies' BorderWare goes the furthest in this direction. BorderWare is designed as a combination security firewall and Internet server, with all services integrated into the base system.

To keep its firewall safe, Border locks out all interactive access. In an earlier review of BorderWare, we took the vendor to task for not providing an escape if you want to separate out security and service applications. In the newest version of its software, Border has partially answered that complaint by allowing the connection of a separate network segment just for handling Internet information servers.

If you're uneasy about the security of public domain products for Web, FTP and SMTP service, you may want to look at Secure Computing Corp.'s Sidewinder and Harris Computer Systems Corp.'s CyberGuard.

Both of these servers include heavily modified versions of Unix designed to contain any security breach that might be created by a poorly written application. Sidewinder's type enforcement keeps even privileged applications and users from modifying data or processes outside of their own security domain. Similarly, Harris' simpler multilevel secure Unix partitions the operating environment and presents a barrier to an out-of-control or insecure application.

While products such as Sidewinder and CyberGuard are specifically designed to run services on the firewall, some other vendors discourage this practice, including Milkyway Networks Corp., Digital Equipment Corp., Trusted Information Systems, Inc. (TIS) and Checkpoint Software Technologies, Ltd.

DNS configurations give firewall vendors (and net managers) more trouble than any other aspect of firewall configuration. In some cases, a split DNS, which uses two DNS servers to hide internal information from the outside, makes the most technical sense — for example, when you have two mail servers, one for external users sending messages in and one for internal users sending out, both with the same name.

Some vendors provide both internal and external DNS servers from the firewall, such as Secure Computing, Border, SOS Corp. and Harris. Other vendors, including Milkyway, Digital, TIS, IBM and Checkpoint, provide only one.

Because products from Milkyway, Harris and Checkpoint support packet filtering, they are the only Unix-based firewalls that do not require at least one DNS server to be located near the firewall. Livingston, NSC, Network Translation and Network-1 do not support any services (including DNS) on their firewalls. Since DNS configuration information changes constantly in many organizations, we felt most comfortable with firewalls that let us move the DNS away from the security perimeter.

—Joel Snyder

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services, such as Web, SMTP and DNS servers, varies from vendor to vendor. Firewalls such as TIS' Gauntlet, Digital's Firewall for Unix, Secure Computing's Sidewinder and SOS' Brimstone prohibit any direct access, requiring everything to pass nontransparently through the firewall. These products expect Internet-accessible services to be outside of the firewall.

Although this can increase the security of a domain, it also raises problems. For example, most Unix-based firewalls use sendmail as their mail system, a program notoriously difficult to configure. When an organization wants to use a real electronic mail backbone, the firewall gets in the way by providing a difficult-to-track stopping point for messages into and out of the network. For example, a bug in Digital's Firewall for Unix mail implementation prevented us from sending many kinds of mail from strictly compliant mail agents through the firewall, something we were unable to work around because we couldn't disable the mail proxy.

Other firewalls allow limited access — for example, to allow connecting incoming NNTP packets to a single system inside the firewall. Packet-filtering firewalls are the most generous, giving you the flexibility to identify internal systems that are available directly from the outside world.

Most circuit-gateway firewalls implicitly provide a restricted NAT function. For example, Digital's Firewall for Unix, Secure Computing's Sidewinder, TIS' Gauntlet, Border's BorderWare and SOS' Brimstone all have nonnegotiable NAT: Nothing outside gets to see IP addresses inside the firewall.

The king of NAT is Network Translation's PIX, which combines NAT and some firewall functions such as filtering rules. PIX allows static mapping of IP addresses, which lets you designate specific and controlled holes through the NAT hardware. PIX can also use a pool of IP addresses to randomly and dynamically give access to systems inside the firewall trying to get out. PIX's NAT includes adaptive security, which prevents a potential intruder from trolling for insecure systems by randomly picking addresses and trying to connect to them.

Milkyway's Black Hole, IBM's SNG, CheckPoint's Firewall-1 and Harris' CyberGuard all have some optional NAT functionality.

HOW WE DID IT

Before testing, we established three sample security policies that an organization might support. We called them loose, standard and tight.

We attached each firewall to our lab network, which is connected to the Internet. And we placed two workstations and a protocol analyzer inside the firewall.

We implemented as many of the policies as each firewall supported. For each policy, we did simple tests to ensure that the firewall was doing what we expected.

In addition, we tried some basic confidence tests, such as trying to communicate across the firewall while it was booting.

We also attempted to communicate outside the policy to see how well and how efficiently each firewall handled logging and alerting.

In all, we looked at 16 different characteristics, including product philosophy and orientation, flexibility, management style, reporting, user interface and documentation.

Managing firewalls

Early adopters of firewall technology were, of necessity, both security and operating system experts. Public domain tool kits became the base on which highly customized firewall systems were built. Fortunately, this level of expertise and homegrown modification is no longer necessary. Several of the firewalls we tested provide excellent user interfaces, which allow any network manager to easily configure a firewall securely.

Digital's Firewall for Unix has the best thought-out and most powerful management interface of all the products we examined. The firewall and operating system are managed using Netscape Navigator on a locally attached X Window System display, which makes configuration modifications simple. Digital also includes all of its documentation on-line as hypertext, which is a tremendous help.

Border's BorderWare also has an easy-to-use interface. Because the interface is screen-based via curses, a Unix-based screen library, rather than X Window-based, it has fewer frills, but it was seldom difficult to understand.

Both of these products employ a single interface to handle operating system and firewall configuration tasks, something we appreciated. Writing this review exposed us to seven Unix flavors, so not having to deal with the nitty-gritty of network configuration on each operating system was a blessing.

A close runner-up is CheckPoint's Firewall-1, which also uses X Window but has a more opaque interface. Some of this complexity is due to the product's wider range of capabilities; that is, many things you can do in Firewall-1 are not possible in Firewall for Unix or BorderWare.

Milkyway's Black Hole and IBM's SNG also have competent X Window-based management interfaces, but they're more difficult to use than the others. Both made up for this with good documentation, Milkyway's on paper and IBM's on-line.

TIS' Gauntlet, Secure Computing's Sidewinder and Harris' CyberGuard provide screen (curses) based management interfaces that are also simple enough to use. However, all of these required us to dip into Unix more than we liked for command-line configuration of either firewall or operating system options. Sidewinder's interface was rather unstable: It crashed several times while we attempted to configure the software.

Even worse, when we were forced to manually edit a configuration file — because the documentation told us to — a single misplaced space in a file made the firewall unusable and took more than two hours to recover from.

Command-line interfaces on NSC's Security Router and Livingston's Firewall IRX were also unexciting, although the types of operations required made them easy enough to configure. In this case, though, the margin for error was significantly higher. These systems require far more expertise and knowledge of network security than most of the other firewalls.

Our worst experiences were with the management interfaces on SOS' Brimstone and Network-1's FireWall/Plus. Both of these need significant human reengineering before they'll be ready for mere mortals. FireWall/Plus hinted at amazing power and a fascinating command language, but the design of the firewall was such that only an expert could feel comfortable and then only after a lot of practice and testing.

Documentation generally followed user interface in terms of thoughtfulness and completeness. Milkyway and SOS get special kudos for including a separate user manual for end users inside and outside the firewall, while Digital and IBM had the best on-line documentation.

Reporting, logging and alarms

One basic requirement of firewalls is that they squeak when pressure is applied. If someone is probing a network for weaknesses, a good firewall should log the attempt and provide an immediate alarm should the attack be serious. You may also want the firewall to provide general reports of TCP/IP traffic for capacity planning and other administrative purposes.

The only product we looked at that provides no logging, reporting or alarm capabilities is Network Translation's PIX. Livingston's Firewall IRX and NSC's Security Router are only a little better. They provide logging information — via the network — to a host; it's up to you to write custom software to set alarm conditions. Neither router provides traffic statistics for general reports.

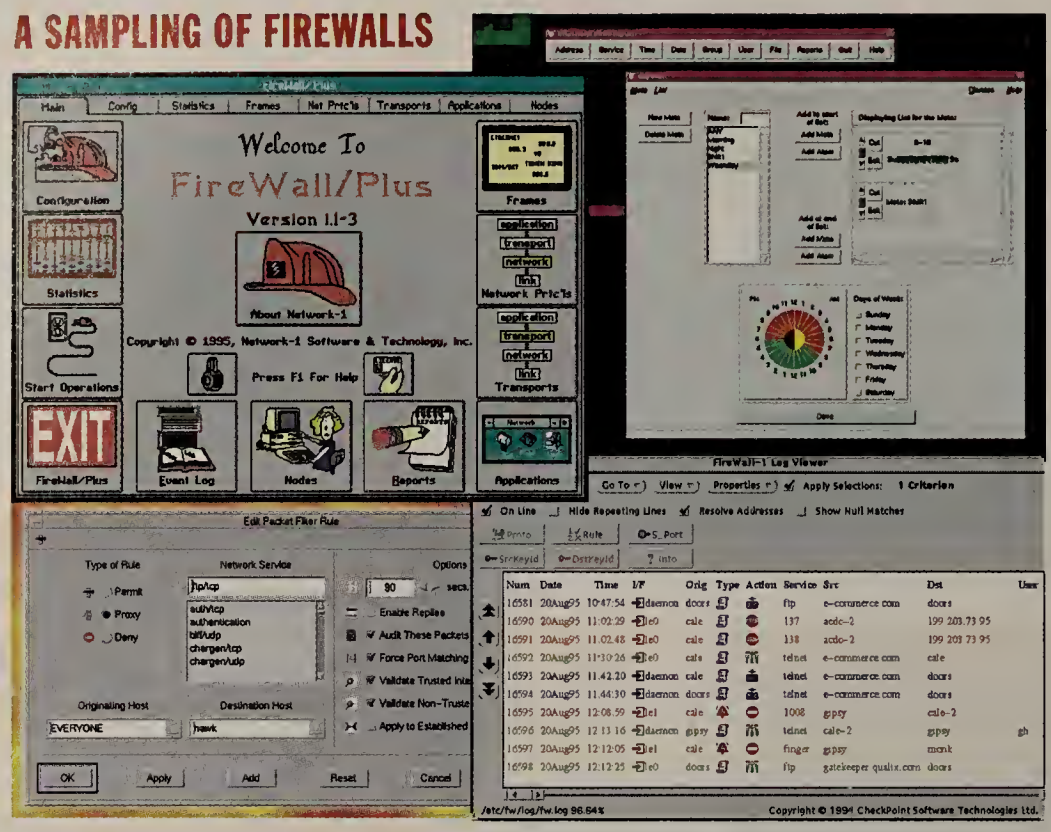
The best alarm, logging and reporting capabilities were in TIS' Gauntlet, Digital's Firewall for Unix and Secure Computing's Sidewinder. These three products provide good all-around capabilities to capture statistics, notice problem situations and generate readable logs of probes and attacks.

Digital's reports are outstanding. With the product's hypertext documents, you can drill down through reporting data using the supplied Netscape browser to see more information about how the firewall is being used. Digital's alarm conditions are comprehensive. Firewall for Unix moves from a green state, as shown by the background on the user interface, through yellow, orange and red, with different actions occurring at each time. Firewall for Unix's ability to intelligently shut down some or all traffic flowing through it in response to a probe was a unique feature.

If summary reports are not important, the logging and alarm facilities in IBM's SNG, CheckPoint's Firewall-I and Harris' CyberGuard are all satisfactory. Network-1's FireWall/Plus looked as if it had good reporting capabilities, but it crashed every time we tried to

Continued on page 66

A SAMPLING OF FIREWALLS



Among the products *we looked at, clockwise from upper left: Network-1's FireWall/Plus, SOS's Brimstone, Checkpoint's Firewall-1 and Harris' CyberGuard.*

NetworkWorld Fusion
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Go to Network World Fusion for advice on determining what characteristics you need in a firewall as well as for book and training references that discuss firewalls in more detail. Also available is the text of a previous firewall review (July 31, 1995, page 1).

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generate a report.

We found Milkyway's Black Hole, SOS' Brimstone and Border's BorderWare difficult to set up and manage for alarms. It was not obvious how to best configure the firewall to alert us when something bad was happening.

Other features

Firewalls come with a variety of additional bells and whistles to assist the security manager. Some are simple yet valuable additions, such as time-of-day rules. Others are more specialized, such as encrypted IP tunnels, and may not be useful in all environments. For more on these features, see "Tunneling and encryption" on Network World Fusion.

Network managers interested in restricting Internet access to off-hours can use time-of-day and day-of-week rules to enable, for example, unrestricted outgoing Web access after hours while keeping the lid on it during the day.

Milkyway's Black Hole has the most complete time-based access controls, including time-of-day, day-of-week, day-of-month, week-of-year and month-of-year rules. Digital's Firewall for Unix, Network-1's FireWall/Plus, Border's BorderWare and SOS' Brimstone also have time-based rules, with somewhat less flexibility.

Our favorites

After looking at 13 products, we came to the conclusion that no one product is appropriate for all security environments. However, we did have some favorites among the crowd.

For a low-cost entry into the firewall market, Livingston's Firewall IRX router is hard to beat. For about $3,000, you get a simple firewall that does what Cisco Systems, Inc., Bay Networks, Inc. and 3Com Corp. routers don't: It makes a racket when someone tries to break in. The simple addition of logging facilities makes it worthwhile to use the Firewall IRX as a replacement for your Internet connection router.

We also liked the power of NSC's Secu-

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Steps for making the right selection

Choosing an Internet firewall starts with a clear definition of your security goals. Decide ahead of time what elements your policy will have, what logging and alarms you will need, what authentication is acceptable and where you need to put security barriers.

Next, decide on your system management philosophy. Do you want to have a vendor provide an all-in-one solution that you plug in and let loose? Or do you want an active part in defining filters, rules, special types of proxies, obscure protocols and unusual cases? Do you want to manage the firewall platform (typically a Unix system), or should this be a hands-off system?

Finally, think about the relationship between the firewall and other services on your network. What are the service goals that this firewall will support? Will you be expecting the firewall to handle Domain Naming Service? Process SMTP electronic mail? Be your World-Wide Web server? Or do you want to make a clear separation between the firewall and network services?

Once you have policy, philosophy and service goals in place, you'll find that only a few products on the market really fit your needs. Nothing takes the place of doing your homework on your organization first.

Remember that firewalls are just one part of a much larger security plan. The greatest danger to corporate network security comes from internal users, not external attackers. Corporate networks are especially vulnerable to the simplest of eavesdropping and impersonation attacks, as well as just plain negligence and carelessness. Firewalls are also not the final answer to external security problems. A dedicated criminal can break into any network, given time and resources.

—Joel Snyder

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Continued from page 66

rity Router, but this product clearly fits another niche — one where multiple parts of a large organization need restricting routers between them. For a company that needs some internal security to keep the manufacturing department's programmers out of the accounting department's system, Security Router fits the bill.

Network-1's FireWall/Plus is for the true network expert. You need to really understand TCP/IP and Ethernet to properly configure the FireWall/Plus, but you can do things with it that no other firewall lets you do, including easy filtering of unusual IP protocols, IPX, AppleTalk, DECnet, and even less popular protocols such as Digital's Local Area Transport or Local Area VAX Cluster. Like Security Router, FireWall/Plus is most appropriate for sites with a simple security policy or for internal protection.

Similarly, Network Translation's PIX isn't a general-purpose firewall, but, in certain situations, it can provide firewall-like functions and solve addressing problems.

CheckPoint's Firewall-1 remains a favorite, even if security czars don't like packet filters as much as application proxy gateways. In our first review, this was a clear leader. The competition has come a long way since then, and, in reponse, CheckPoint has added a few knobs so it can say its product does everything. It's fundamentally a good product with a fantastic management interface.

Firewall-1 also offers what no other firewall has: centralized configuration and administration of multiple firewalls from a single point. If your network requires multiple firewalls, Firewall-1 is a must-buy.

If you want a firewall but don't want to play with Unix, you should definitely investigate Digital's Firewall for Unix. The best management interface of all the firewalls we looked at makes this easy to configure. The reporting capabilities are also great.

Although there are limitations on the possible configurations, Firewall for Unix hits squarely in the middle of most corporate requirements for an Internet gateway system.

Managers who like the all-in-one approach need to look at Border's BorderWare Firewall Server. This is the ultimate black box: It comes up running firewall, FTP, Gopher, Web, News, Post Office Protocol, SMTP and Telnet gateways. For midsize companies that don't want to fool around, BorderWare is an excellent choice.

Of the remaining application proxies, Milkyway's Black Hole is our favorite. With a generally clear management interface, you can make the Black Hole do almost anything you want — act as a NAT, handle multiple interfaces, require authentication, be transparent and support Internet access by inside users with more finesse than any other product.

TIS' Gauntlet, although fundamentally old technology, has an advantage all its own: source code. If you like to play with software, Gauntlet is the ultimate foundation on which to build your own firewall and therefore the product of choice for many security experts.

We didn't have any complaints about Secure Computing's Sidewinder, IBM's SNG, SOS' Brimstone or Harris' CyberGuard, but they didn't stand out like some of the others. IBM's IP tunneling is well thought-out, and both Harris' and Secure's "secure" Unix looked like they would be invaluable in some environments. In the absence of specific requirements, though, they wouldn't make it to our short list.

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 49.

Snyder is a senior partner at Opus One in Tucson, Ariz. He can be reached via E-mail at jms@opus1.com.

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*In-Stat, Worldwide Enterprise Remote Access Market Share, 1994

*Dell'Oro Group, Worldwide Remote Node Server Market Share, First Half 1995

*IDC, Worldwide Combined Hardware and Software-Based Remote Access Server Market Share, First Half 1995

Continued from page 57

sons large-scale SNA customers have kept an arm's length from ATM.

"Companies have fine-tuned their SNA nets so there is a symbiotic relationship between the end points and hosts, and the result is extremely fast response times," Dzubeck says. "You won't see many users racing to upset that apple cart." According to Dzubeck, conservative SNA customers waited well over a year to implement frame relay, even though IBM made a solid case for it.

In place of LAN emulation, IBM is moving to roll out support for Advanced Peer-to-Peer Networking and its High Performance Routing (HPR) across ATM virtual circuits. That will enable you to draw upon APPN's class-of-service, transmission priority and bandwidth control features across ATM nets. It also means you migrate to ATM services simply by installing ATM MSS adapters on ATM access devices, which may be switches, routers, workstations hubs and other communications equipment. And you retain the ability to use the same familiar session establishment and APPN directory services in the ATM world.

One downside, however, according to independent consultant Anura Guruge, is that IBM has already conceded it will not have SVN fully available until late this year. Additionally, IBM still does not offer APPN/HPR on the 3172 controller. Likewise, IBM does not yet offer its dependent LU Requestor (DLUR) technology on its 6611 bridge/routers, 2210 access server and 3746-950 front-end processor, while Cisco has offered such support on its routers since last April. DLUR enables you to pass 3270 traffic across APPN links.

"The future of APPN and HPR is not in IBM's hands, but is in Cisco's," Guruge says. In fact, Cisco already offers a version of APPN to usher APPN data over an ATM transport.

The company supports APPN Intermediate Session Routing (ISR), a version of APPN that will let users send SNA data over an ATM link with less overhead than provided by a LAN emulation server, according to Randall Campbell, a 16-year IBM veteran who is now product-line manager for switching at Cisco's InterWorks Business Unit. And little more than two months from now, Cisco will roll out native HPR support on its routers. But there's a catch: Cisco's HPR will run over Synchronous Data Link Control links initially, not ATM. ATM support will be added later, Campbell says.

Abensour says IBM's HPR, which will begin shipping in the second half of this year, will be worth the wait. It offers four to 10 times better performance than Cisco's ISR, he says, and supports a rate-based flow control mechanism, which will provide a higher level of trunk utilization than ISR.

But Campbell contends that IBM's rate-based algorithm may interfere with ATM's own congestion mechanism. Abensour says that's not the case because they address entirely different areas.

The outlook

Even with all the technical wrangling, analysts suggest IBM still has a shot at making Gerstner's prophecy come true.

Vertical Systems' Malone says the issue will come down to where strategic applications reside.

"If your mission-critical data is still in SNA applications, you'll go with IBM," Malone says. "If you've moved your mainstay business applications to routers, Cisco or one of the others may be the choice."

Adds CIMI's Nolle: "IBM's ATM strategy will reflect the reality of SNA traffic flows, and the others will not." IBM's success, he says, hinges on how soon users adopt the company's ATM philosophy.

"If there's a considerable reinvestment in routers, Cisco and others win," Nolle says. "If we find a huge penetration of ATM, that suggests users will reject routing and move to switching."

Ultimately, Nolle says, IBM doesn't have to own the ATM market to succeed.

"IBM is not principally a network company, it's a computing company," he says. "It can come in and set the agenda for ATM and let others meet those goals. All IBM needs to do is protect the needs of its mainframe customers and make sure ATM plays to that customer. They expect IBM to solve the problem of supporting legacy SNA data over ATM. And IBM will give them what they want." ■

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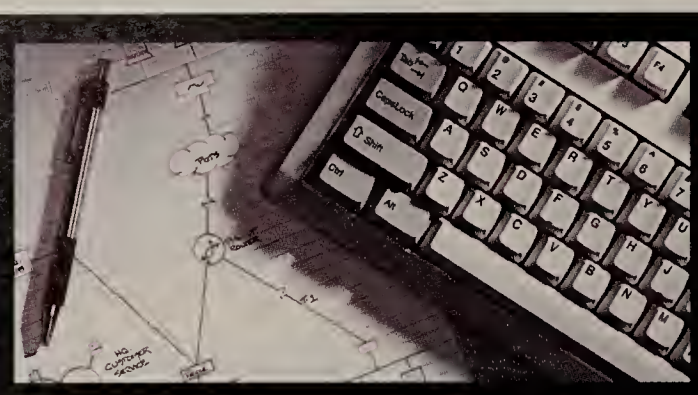

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9. Examine how emerging CTI (Computer Telephony Integration) capabilities like Novell's TSAPI and Microsoft's TAPI can be integrated into your remote access strategy
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Briefs

■ **Vanstar Corp.** *is taking its network systems integration business international via its* **Global Enterprise Services.**

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In addition, the firm's European consulting group, Vanstar Professional Services, will grow from the 20 people stationed in Luxembourg to more than 50 with the opening of new offices in Belgium and London.

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■ **PC DOCS, Inc.** *will hold its annual user and developer conference Feb. 11-14 in Orlando.*

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■ **Learning Tree International** *has named several firms to its* **Training Advantage Partners** *program.*

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A different network is key to career planning

By Frank Schoff

Few things will put you behind the eight ball in a job search faster than failing to maintain contact with the people in your personal network, the circle of friends and compatriots who can point you to the vast number of openings that are never advertised.

While it's a part of your professional life, personal networking is often misunderstood. Too often, it is perceived as cocktail-party schmoozing — using others to meet your own needs or to answer a cry for help when you lose a job.

But it doesn't have to be like that. When done well, personal networking is a valuable component of career development. In fact, it is becoming more essential given today's job market in which you're more likely than ever before to change employers every few years.

Here's answers to frequently asked questions about personal networking and how to do it well:

WHAT IS A PERSONAL CAREER NETWORK?

In the broadest sense, it is a collection of all the people you know who have information that can help advance your career. A personal network can be thought of as an onion: As you peel back the layers, you go from the individuals at the outermost of your network — the people you've met once or may know of but have yet to meet — to long-time business associates and friends at the innermost. You, of course, are at the core.

In this initial definition, nothing has been said about finding a job. You cannot and should not develop a personal network simply for that singular and self-serving purpose. It will cause your contacts to disappear quickly. Alternatively, you'll be left with contacts who are shallow, temporary and more interested in helping themselves than you.

HOW DO I MAINTAIN CONTACTS IN A PERSONAL NETWORK?

Use a computer database or the more ubiquitous Rolodex. Besides basic business card information, include the date and nature of your first or last contact with the person, the names of his associates, the person's primary areas of expertise or interest, and other information that might establish a basis for continuing contact.

Think hard before you opt not to include a name in your network database or dump names from it — you'll likely kick yourself later. The point is, don't make a shortsighted assessment of a network contact's value based purely on current needs, interests or relationships.

HOW DO I USE THE NETWORK?

You use it like an insurance policy. You establish it, expand it as your needs and interests grow, put more into it than you will ever hope to draw out, take comfort from knowing it exists and pray you never have to use it.

However, when the day comes, you turn to this close circle of contacts and get the type of job leads that may go unnoticed by others.

Furthermore, use the network to help others. If you are viewed by members of your network as a resource for career development advice, a source of leads to new career opportunities and a general sounding board, your contacts will be there for you when you need them.

They will open doors to people in their networks, and you'll be amazed at the value of these newfound contacts.

DOES THE NETWORK WORK?

You bet it does. Ask anyone who has launched a serious search for a new career opportunity. People without networks know what they're lacking, and those who do have one will testify to its value.

Any recruiter — whose livelihood depends on an effective network of contacts — will tell you networks work.

Other tips

Establishing a network is relatively easy. You'll find the contacts you need in the normal conduct of business and personal life. Maintaining and nurturing your network is more difficult, requiring a conscious effort and willingness to give without any assurance of a return.

The ease with which you can tap your network when needed will be in direct proportion to the effort you have given to establishing, maintaining and nurturing it.

The choice of having a personal network is yours. But like failing to have a good insurance policy, the risk of not having one is almost too great to ignore.

Schoff is president of Management Recruiters in Cedar Mountain, N.C., and specializes in the placement of networking professionals. He can be reached by phone at (704) 884-4118 or by fax at (704) 884-3512.

Frank Schoff's other career development articles can be found on Network World Fusion at http://www.nwfusion.com. You'll also find links to on-line job offerings. Select Careers, then look for Management Strategies and Networking Careers.

NetworkWorld Fusion

Personal network directory

A rundown of candidates for your personal network:

- Past and present **coworkers**, including peers, subordinates and managers
- **Professional associates** and contacts from other companies
- **Suppliers** who sell and support products or services you buy
- **Customers** who buy or use the products or services you provide
- **Consultants**, particularly those who specialize in your area of expertise
- **Recruiters**, especially those who specialize in your profession
- **Former teachers** and **classmates**, including those from seminars you've attended
- And, of course, **friends**

The career support group subnetwork

An effective offshoot of your personal network can be a career support group, which is nothing more than a small, close, group of contacts that gets together on a formal basis. Group members act as sounding boards, advisors and devil's advocates for each other.

The key to the group's success is a commitment to keeping it active and effective by maintaining good chemistry among members. There must be a high degree of respect among members, even though they may have highly differing perspectives on how to deal with various career issues. The members should be able to identify with one anothers' career interests, but don't necessarily need to have similar careers.

The most effective group size is five to 10 people. As you start a group, ban relatives and close friends, because they probably long ago lost their objectivity and ability to advise with total candor. Meetings must be held regularly — once a quarter seems to work well, with members on call for one another as needed.

This type of group frequently forms among those who are out of work, but there's no reason to wait until you're unemployed to start one.

— Frank Schoff

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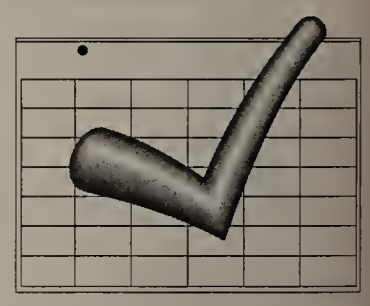

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4/1	Network World + Interop '96, Las Vegas	March 20

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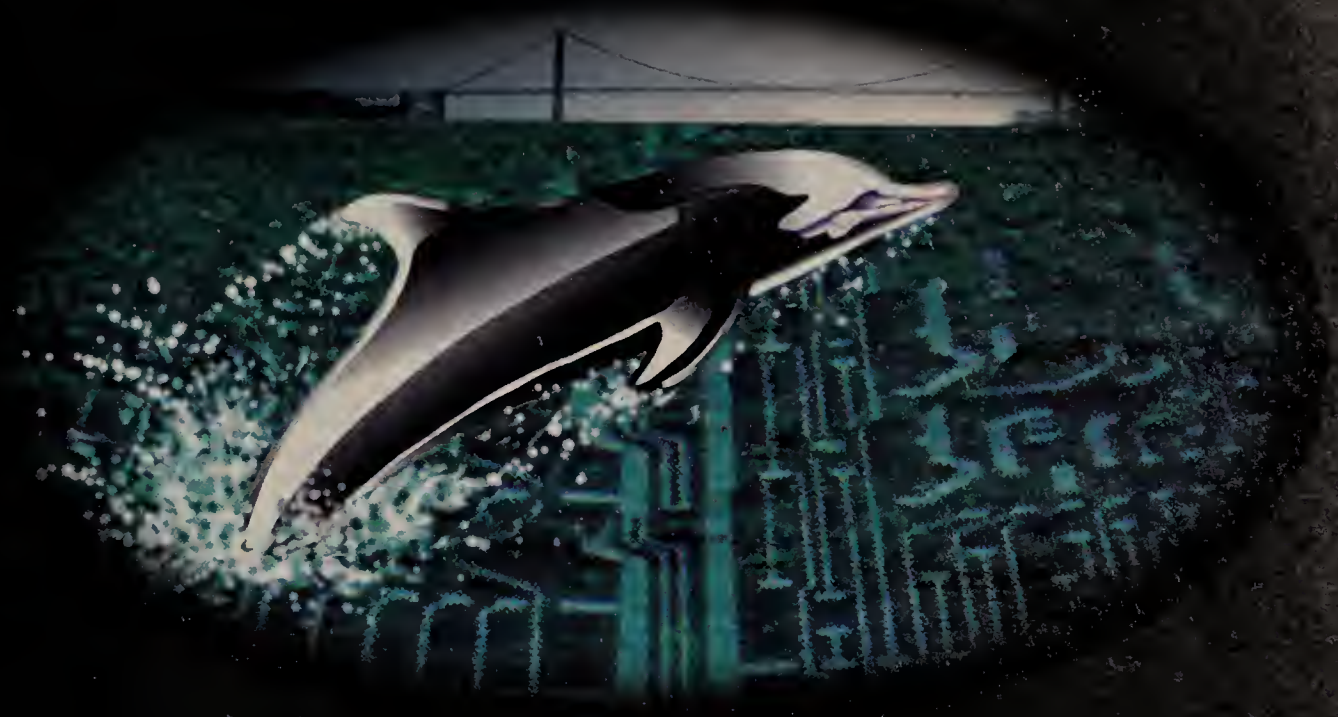

Some Achieve by Leaps and Bounds

We Achieve by Leaping Boundaries

At Cisco Systems, making respectable progress isn't good enough. We always go beyond the expected, always in the direction of wide open possibilities. That's how we've managed to leap so many boundaries in the development of hardware, software, and customized internetworking products. Very soon, virtually every industry will rely upon internetworking. That means they will rely upon Cisco.

Cisco Systems is the leading global supplier of enterprise networks, including routers, LAN and ATM switches, dial-up access servers and network management software. These products, integrated by the Cisco Internetwork Operating System (Cisco IOS™) link geographically dispersed LANs, WANs and IBM networks. Cisco is headquartered in San Jose, CA and is traded under the NASDAQ symbol CSCO.

The following positions are available in **San Jose, CA**; **Irvine, CA**; **Billerica, MA**; and **Research Triangle Park, NC.**
Cisco offers relocation assistance as part of the total benefits package.

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- ATM Software Development
- Dial-up Internetworking Software Development
- Forwarding & Switching Software Development
- Real-Time & Diagnostic Firmware Engineers
- Directors, Software Development
- Managers, Software Development
- Frame Relay Software Development
- Remote Access Software Development
- Router Protocols Software Development
- Multimedia Software Development
- Security Software Development
- Desktop Protocols Software Development
- Portability Software Engineers
- Kernel/Systems Architecture Engineers
- Digital Board Level Hardware Engineers
- ASIC Development Engineers
- Network Management Engineers
- GUI Engineers
- Test Development Engineers
- Test Integration Engineers
- Quality Systems Engineers
- Manager, Development Test
- Software Release Engineers
- Program/Project Managers
- Customer Service Engineers

Marketing

- Network Management Product Line Managers
- Switched Products Product Managers
- Product Marketing Engineers

For prompt consideration when faxing your resume, please use white paper with 12 point black font. Please refrain from using bold type, underlining, italics, or fancy typeface. Be sure to include relevant keywords that describe your skills and experiences.

For additional details on job descriptions and qualifications, please preview our home page on the World Wide Web at: **http://www.cisco.com**

For **San Jose, CA** positions, please send your resume, indicating position of interest, to: Cisco Systems, Inc., Human Resources, P.O. Box 640730, San Jose, CA 95164-0730. FAX (800) 818-9202.

For **Irvine, CA** positions, please send your resume, indicating position of interest, to: Cisco Systems, Inc., Human Resources, Access Business Unit, 2569 McCabe Way, Irvine, CA 92714. FAX (800) 818-9202.

For **Billerica, MA** positions, please send your resume, indicating position of interest, to: Cisco Systems, Inc., Human Resources, 1100 Technology Park Drive, Billerica, MA 01821. FAX (800) 818-9202.

For **Research Triangle Park, NC** positions, please send your resume, indicating position of interest, to: Cisco Systems, Inc., Human Resources, 7025 Kit Creek Rd., P.O. Box 14987, Research Triangle Park, NC 27709. FAX (800) 818-9202. EOE All trademarks belong to their respective owners.

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At Microsoft, we believe one idea can have an enormous impact—and one person can create a world of change. Today, as business data continues to migrate off the mainframe and into client/server architectures, our Consultants are working with key decision makers at Fortune 500 companies to provide them with some of the industry's most sophisticated solutions. With virtually unparalleled resources at their disposal, including access to the most powerful technologies available, they drive acceptance of Microsoft products and technical solutions.

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NETWORK ARCHITECTURE: Requires strong large scale LAN architectural experience with NT™ Server, Windows® for Workgroups, LAN Manager or other advanced network OS. Knowledge of Systems Management Server, TCP/IP, gateways, bridges, routers, network diagnostic tools, mail/messaging systems, RDBMS and GUI applications development preferred.

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WINDOWS APPLICATION DEVELOPMENT: Requires strong Windows/Windows NT/Windows 95 development experience using C/SDK, C++, Visual C++™/MFC and/or Visual Basic®, and demonstrated GUI application design and development experience. OLE, RDBMS and/or LAN design/implementation preferred.

DATABASE DEVELOPMENT: Requires significant logical and physical design experience with SQL Server/other advanced RDBMS. Knowledge of database performance tuning, OLE, ODBC, network architecture and GUI application development preferred.

CONSULTING MANAGEMENT: Requires management of large scale projects/consulting staff members and client/server business development. Client/server based development experience and knowledge of Microsoft products/architectural strategies strongly preferred.

A Bachelor's degree in Computer Science or other technical discipline and Microsoft Certified Professional status preferred for all positions. Opportunities are available in most major cities nationwide. We are an equal opportunity employer and support workforce diversity. Mail, fax or email (in ASCII text or Word 6.0 format) your resume to Microsoft Consulting Services in the geographic region of your preference, indicating Dept. NW-0129:

Northeast: 9 Hillside Ave., Waltham, MA 02154; FAX (617) 487-5751; email: sharonel@microsoft.com

Mid-Atlantic/Southeast: 5335 Wisconsin Ave. NW, Suite 600, Washington, DC 20015; FAX (202) 363-9183; email: tonyje@microsoft.com

Midwest: 77 W. Wacker Dr., Suite 4000, Chicago, IL 60601; FAX (312) 345-7417; email: briancor@microsoft.com

Southcentral: 5080 Spectrum Dr., Suite 900E LB3, Dallas, TX 75248; FAX (214) 386-0700; email: brianhal@microsoft.com

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LAN/WAN INTERNETWORKING - technical consulting with hands-on design and engineering skills for frame/cell relay, routers/bridges, LAN operating systems, intelligent hubs/switches, Remote Access, TCP/IP and SNMP network management.

NETWORK MANAGEMENT - architecture, design & implementation of network mgmnt systems including distributed polling/processing, alarm correlation, performance monitoring and reporting. Exp w/HPOV, Netview, Spectrum, Sun Net utilizing RMON & SNMP.

NETWORK OPERATIONS - network control center support and troubleshooting for global, frame relay and multi-protocol WANs. Experience in rapid detection and resolution of transmission circuits and equipment (routers) problems via SNMP management platform. Previous Level 1, 2 or 3 required. International carrier/PTT experience a plus.

If you are up to the challenge and want to work in a fast paced environment, with advanced technologies we will offer you outstanding compensation and bonus opportunities. Independents are also encouraged. Immediate short/long term contracts are available. For immediate consideration, FAX, Email or send your resume today to:

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NETWORK SPECIALISTS

Network Solutions, Inc., a wholly-owned and operated company of Science Applications International Corp. (SAIC), is at the forefront of the industry in applying information technology to the challenges of our clients. The following positions are immediately available in locations throughout the United States:

SENIOR NETWORK CONSULTANTS/NETWORK ENGINEERS - Provide support for the design and implementation of state-of-the-art multiprotocol networks. Must possess in-depth knowledge and hands-on experience in a LAN/WAN environment with information architecture development utilizing emerging technologies such as ATM, SONET, Frame Relay, Client/Server, SMDS and on-line services. Senior Network Consultants require a broad technical background plus experience in a similar position as well as the ability to consult on large projects, articulate information strategies and work with senior management. Network Engineers require previous work experience with Bay Networks, Cisco, Wide Area access and broadband products utilizing TCP/IP, IPX, SNA, and SRB protocols.

NETWORK MANAGEMENT ENGINEERS - Provide management, performance, and capacity planning support through the development, deployment, and operation of complex distributed network management and performance systems and tools. Desirable experience includes: UNIX, HP OpenView, Sun Net Manager, SunOS, Cshell, C, SynOptics Optivity, Cabletron LANView or Spectrum, Wellfleet Site Manager, SNMP MIB v1 or v2, NIS DNS, TCP/IP, and RMON.

UNIX SYSTEM ADMINISTRATORS - Support network management systems on large/complex networks. Should possess experience configuring and supporting HP UX, SunOS and BSDI systems for use with SQL databases, such as Sybase and Oracle, as well as network management platforms and systems, such as HP OpenView, Sun Net Manager, SynOptics Optivity, and Cabletron Spectrum.

SOFTWARE ENGINEERS - Provide software development and maintenance of C, Perl and embedded SQL applications under UNIX as well as TCP/IP client/server networking. Develop TCP/IP services protocol and network security. May also provide network security analysis, system troubleshooting, network management, and information services development and maintenance. Should be an innovative self-starter prepared to work with a very visible Internet operation. Requirements include a BSCS or equivalent, 3+ years C/UNIX software development experience as well as knowledge of SunOS, Solaris, BSDI UNIX system administration and UNIX network security. Must have knowledge of Internet routing, DNS, and IP networking services as well as familiarity of TCP/IP and Internet tools such as ftp, telnet and web browsers. Relational database experience (INGRES, Oracle, Informix) desirable.

We offer a competitive compensation and benefits package. To join in our future growth and success please send your resume and salary requirements, indicating position of interest, to: **Ivan Yopp, Network Solutions, Inc., 505 Huntmar Park Drive, Herndon, VA 22070; FAX#: (703) 742-4837; email: ivany@netsol.com** EOE M/F/D/V.

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Network Support Expert - For this senior-level position, we seek a highly motivated network technologist with expert skills and extensive experience related to Frame Relay, Cisco routers, Ethernet and Token Ring. Solid network troubleshooting and support experience with routing and hub technologies in a multi-protocol WAN/LAN environment is required. Other necessary skills include expertise in Sniffer, packet decoding, RIP/SAP filtering, TCP/IP, IPX and SNMP, and proven project management abilities. Background in DNS, large modem pools, use of SNMP-based network management, and switching technology is preferred. Job Code NSE

Network Support Technologist - For this important support role, we seek a network technologist with solid problem diagnosis and resolution skills, background using tools such as Spectrum and Distributed Sniffer to identify, analyze and resolve network problems, and ability to work in a fast-paced, team-oriented environment. Experience with TCP/IP and IPX in Token Ring and Ethernet environments is required. Background supporting Cisco routers and Cabletron hubs, as well as NetWare 3.11 and NT experience, are preferred. Working with other network operations staff, this individual will have responsibility for production support of our entire network infrastructure. Job Code: NST

We offer highly competitive compensation, full-featured benefits including relocation assistance, and excellent growth potential. For consideration, please forward resume with salary requirements to: **Human Resources, Dept. PG-indicate job code from above, Ryder System, Inc., 3600 NW 82nd Ave., Miami, FL 33166.** For more details about our dynamic company, see our Internet Home Page at http://www.ryder.inter.net/ryder

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enior Consultant. Provide racle database administration nd system administration xpertise. Ensure that the tele- honic Voicetek software inter- ces appropriately with the racle RDBMS. Focus on atabase planning, design, re- gineering, client-server imple- entations (using SQL*Net 2), installations, Oracle back- ps/recovery, space manage- ent, performance tuning and ench marking. Exploiting racle 7.1 to use its distributed atabase concepts, triggers, ckages, procedures and other ferential integrity features. esigning schemes to move ta from Oracle to other data- ses and viceversa. Devising ethods to audit critical data. dministrating the Solaris 2.3 twork and writing Unix shell ograms. B.S. in Computer ience and Engineering is quired. Must also have at st one year and six months experience as a Senior Con- ltant or one year and six onths of experience as a pro- ammer. Experience and/or ucation must include work- g as an Oracle database ministrator; interfacing the lephonic Voicetek/Genera- ns Ver 2.0 software with the racle Ver 7.1 RDMBS in a laris 2.3 environment; Oracle tabase planning, design, re- gineering, client-server imple- ntation (using Sql*Net V2), tallations, Oracle backups/ overy, space management, formance tuning and bench rking; Solaris 2.3 system/ work administration tasks d UNIX shell programming. hours per week, 8:00 a.m. to 0 p.m. Annual salary of 5,000. If interested in this ployment position, send sume to: Brad Lindemann at 03 E. 98th Street, Ste. 101, dianapolis, IN 46226.

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The headquarters of our Network Products Division (NPD) is based in **suburban Portland, Oregon**, the largest Intel site. Developers of Remote LAN access solutions, end-to-end network management products and best of class network adapters, this solutions-oriented division has opportunities for professionals who take a proactive approach to high bandwidth networking and communications challenges

All positions require a minimum of a BS degree and 3+ years' related experience. MS preferred for many of the positions.

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Join us as the principal software architect for all UNIX-based network driver development. Define/develop new drivers across many hardware platforms and define strategies for development across product lines.

Components Product Engineer

Develop full custom standard Intel designs using design, quality, reliability and verification processes.

Technical Marketing Engineers

Drive major account sales and marketing activities in the growing OEM segment. Must understand LAN technology and debugging of mixed HW/SW products.

Test Engineers

Must possess C programming experience, DOS and Windows literacy, PC bus and system knowledge and strong problem solving skills.

Manufacturing Engineers

Utilize your SMT manufacturing experience. Must have strong DFM, problem solving and project/time management skills.

Sr. Hardware Design Engineer

You'll perform HW architecture design and implementation of Fast Ethernet hubs. LAN knowledge with familiarity of Ethernet and IEEE Fast Ethernet standards imperative.

Software Engineers

Must have working knowledge of Ethernet LANs, hubs and/or switches and SNMP management standards. Knowledge must include embedded system programming using C/C++ and/or assembly languages. ICE and debugger knowledge essential.

*An additional position exists for a Software Engineer with PC WIN95/WIN NT application development experience.

Evaluation Engineers/ Project Leads

Must have experience in designing, developing, and debugging test procedures and suites for LAN adapters, repeaters, and/or switches.

Development Program Manager

Experience with program management of complex HW/SW product development in emerging markets is required. Must be versed in all project related tools.

OEM Program Manager

Manage routine and long-term OEM product and third-party software vendor relations. Must have a technical grounding in networks, familiarity with UNIX, and negotiation/leadership skills.

Software Engineer

Develop code in C/C++ in a networking environment and program in the first four layers of the OSI model. Must have experience in configuration, test and debug of the network. Analyze low level protocols such as IPX/SPX, TCP/IP and NETBEUI.

Customer Support Engineer

Thorough knowledge of PCs, LANs and LAN products, and telephone support experience are essential. Also requires 1-3 years of Novell installation and support experience.

Product Support Engineer

Work as the liaison between customer support and engineering/marketing product teams. Must have strong LAN and PC hardware and software knowledge, 3+ years' networking experience, CNE required.

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Four past weeks of Networking Careers can be found under Job listing.

IXC Communications, Inc., is Growing! Located in the beautiful hill country of Austin, TX., this established leader in the telecommunications industry is looking for some progressive thinkers that can truly make a difference. As operators of the fifth largest telecommunications network in the United States, IXC is expanding it's network, it's services, and it's thinking. If you believe you can work and contribute in a fast pace, dynamic, team oriented environment, please give the following positions some consideration.

DIRECTOR OF SALES AND MARKETING (DATA SERVICES)
Will be challenged with the development and implementation of sales plans and strategies; Work with the Engineering Department to develop new business and customer solutions; Will develop marketing channels and manage the Technical Sales Support Group for a nationwide data network (Frame Relay & ATM). Must have 5 to 7 years sales and marketing experience with understanding of Data Network Services (FR, ATM, LAN/WAN interconnect technologies), along with proven record in managing and closing complex sales opportunities. A BS/MS degree in EE or Telecommunications recommended.

DIRECTOR OF NETWORK ENGINEERING AND OPERATIONS (DATA SERVICES)
Will be responsible for the planning, implementation and operations of nationwide data framework (Frame Relay, ATM); Will have the opportunity to build a technical team providing the expertise and project management for the design and support of a cutting edge data network. Must have 5 to 7 years experience in Data Networking and Services with extensive knowledge of Data Network and Transmission technologies relative to Frame Relay, ATM, LA/WAN/PC interconnect technologies, along with an ability to strategically plan for and manage a network/systems engineering workforce. A BS/MS degree in EE or Telecommunications recommended.

SR DATA NETWORK ENGINEER
Must have the experience, foresight, and creativity to help IXC DS design and deliver a Public Switching Data Network; Will use data network technologies to build a nationwide fast packet network. Must have 5 to 7 years engineering and support experienced with comprehensive understanding of Data Network Services (FR, ATM, LAN/WAN interconnect technologies), along with a proven record in designing and implementing high speed data transport networks and systems. A BS/MS degree in EE or Telecommunications recommended.

TECHNICAL SALES SUPPORT
An article communicator with excellent interpersonal skills to assist sales in the negotiation of contracts; Perform customer follow-up; Develop technical sales information; SUpport direct & indirect sales channels; Perform network design and cost analysis based on customer needs. Understanding of Frame Relay, ATM and other data networking technologies. One to three years of data services sales/consulting, familiar with financial justification methods for data services, along with a BS in a technical discipline helpful.

NETWORK ENGINEERS
Requires a thorough understanding and experience in equipment installation, testing & turn-up of X.25, Frame Relay, ATM, ISDN, TCP/IP data networks; Tasks include site equipment selection network design layout, data service project management, preventative and emergency maintenance, and assisting sales with collocation request, along with adding technical detail to sales proposals. Understanding of Frame Relay, ATM and other data networking technologies. One to three years of data services design, installation, and maintenance. BS in EE/CS/Telecommunications preferred.

MARKETING ANALYSIS
Responsible for creating and maintaining relative marketing information for the IXC Data Services group, do market assessments, evaluation of competitive pricing and product, determine market penetration potential, perform customer base expansion and sales channel analysis. Knowledge of the data services/telecommunications industry and technology sales, effective oral and written communication skills, ability to work effectively in a team environment made up of sales, engineering, finance, and MIS. A degree in Marketing, Masters beneficial.

IXC offers excellent benefits, competitive salary and a professional atmosphere. Qualified individuals with telecommunications experience should submit a resume with salary requirements to:
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Bring your résumé to the Bell Atlantic Network Integration Suite at the J.W. Marriott Hotel at 1331 Pennsylvania Avenue, NW, between 5:00 P.M. and 7:00 P.M. on:

Tuesday, January 30, 1996
Wednesday, January 31, 1996

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Network World's new Web offering Network World Fusion is the most comprehensive and educational advertising environment on the WWW. Recruitment print ads will be placed on **Network World Fusion for 4 weeks - free.**

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Think SSC.netcom.com

Network & Telecommunications Opportunities

NETWORK DEVELOPMENT PROJECT MANAGER
Direct a wide range of network planning and implementation projects covering areas such as Frame Relay, ATM, SONET, SCATA, and Disaster Recovery, while being prepared for growth to dept. mgmt. position. Southeast, $65-75K.

TRANSMISSION ENGINEER
Design, develop, and support implementation of wide area networks using owned fiber optic and microwave transport facilities.
Southeast, $55-65K.

NETWORK ANALYST (2)
Support development, design and deployment of global wide area data network strategies covering voice, data, and video. Function as project manager or key project team member, working with business units to develop network applications. Technologies will include Frame Relay, X.25, voice equipment, video systems, network management tools. Industry-leading division of Fortune 100 manufacturer.
Northeast, $50-75K.

DIRECTOR, FIELD SERVICE
Manage a field service organization of approximately 100 employees, supporting a wide range of telecommunications and network services. Excellent growth opportunity for experienced field service manager.
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NETWORK ARCHITECT
Architect, design, and direct implementation of multi-protocol internet to support Fortune 500 manufacturer ranked in Computer World 1995 "Top 25 Best Places to Work".
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SALES ENGINEERS
Support sales force in the development and presentation of complex networking and telecommunications solutions to existing and new customers. Company's product line includes a wide range of voice and data network products, and sales often involve "systems integration" solutions.
Positions available in Dallas, Chicago, and San Francisco, $60-75K.

All of the above positions are with Fortune 100 class companies, each regarded as a leader in its respective industry and as an innovative user or provider of networking and telecommunications technologies. For additional information, and a no obligation critique of your resume and skills, contact:

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MRI
P.O. Box 399
Cedar Mountain, NC 28718
Phone: 704/884-4118 — FAX: 704/884-3512

SunGard Recovery Services Inc., the industry's premier disaster recovery service provider has immediate career opportunities available at our **Midwest** facilities for a **Network Services Engineer.**

Responsibilities Include: providing pre and post sales technical support to the midwest sales staff; design of WAN and LAN recovery solutions; performing technical presentations; responding to Requests For Proposal in support of new and existing business opportunities.

Qualifications: 4 year degree or equivalent experience with at least 4 years directly related industry experience. Experience with WAN and LAN topologies. Knowledge of IXC and LEC offerings, transmission media, EIA standards and analog/digital communication systems. Experience with PC platforms & Software. Excellent oral and written communications skills.

SunGard Recovery Services Inc. offers competitive salary and benefits package. For consideration, please send resume to:

SunGard Recovery Services Inc.
Human Resources
1285 Drummers Lane
Wayne, PA 19087
or fax (610) 688-1304

EOE M/F/D/V

Software Engineers

Multiple positions in the areas of design, diagnostics, release, QA and network management. Must have experience with networking and C programming. Additional experience in one of the following areas:

- Development management
- UNIX device driver software and/or kernel development
- ATM routing protocols
- Network protocol development
- Network management software (e.g., SNMP) and user interface development
- Software testing, configuration management and/or quality control
- Windows NT and/or Novell NetWare device driver software
- MAC system software

Hardware Engineers

Multiple positions in the areas of diagnostics, design and testing. Must have experience in designing and testing computer or network hardware. Additional experience in one of the following areas:

- Development management
- Digital/analog design
- ASIC development & VHDL
- Design of hot swappable boards, power supplies & MTBF calculations
- Familiarity with FPGA/gate-array design
- Developing testing and diagnostics software (UNIX & C required)

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- 623 ☐ Bridges
- 624 ☐ Routers
- 625 ☐ Gateways

LOCAL AREA NETWORKS
- 626 ☐ ATM Switches
- 627 ☐ Ethernet Switches
- 659 ☐ Fax Servers
- 628 ☐ Hubs/Intelligent Hubs
- 629 ☐ LAN Servers
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- 635 ☐ Remote Access/ Communication Servers
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- 639 ☐ Laptops, Notebooks
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- 645 ☐ Diagnostic, Monitoring and Test Equipment
- 646 ☐ DSU/CSU
- 647 ☐ E-Mail/On-Line Services
- 648 ☐ FAX Boards/Modems
- 649 ☐ Fiber Optics
- 650 ☐ Frame Relay
- 651 ☐ ISDN
- 652 ☐ Modems
- 653 ☐ PBX
- 662 ☐ Security
- 654 ☐ SMDS
- 655 ☐ T1, T3, Fractional T1 Mux and Services
- 656 ☐ Videoconferencing/ Teleconferencing
- 657 ☐ WATS/MTS

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- 663 ☐ Storage Cabinets/Furniture

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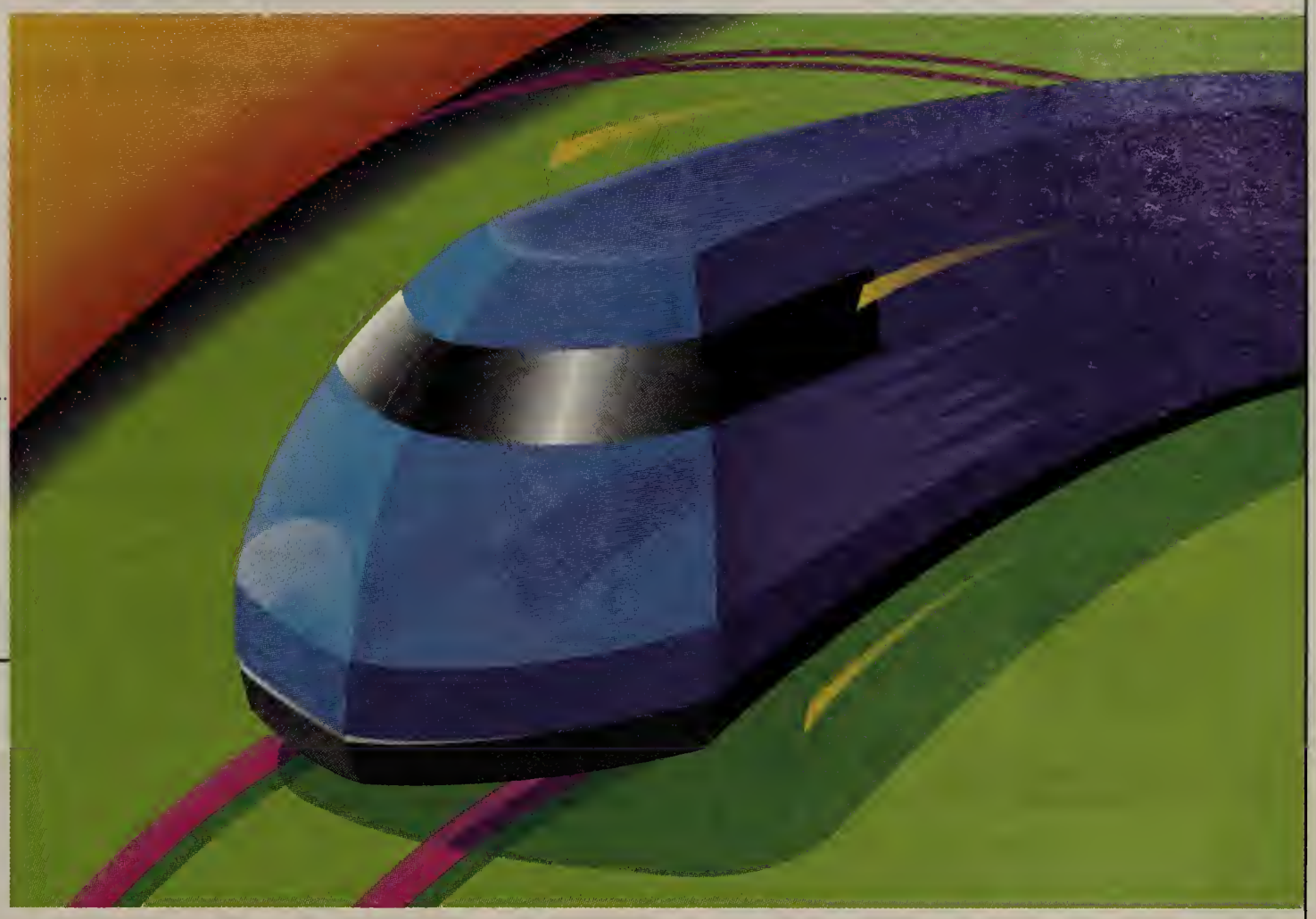

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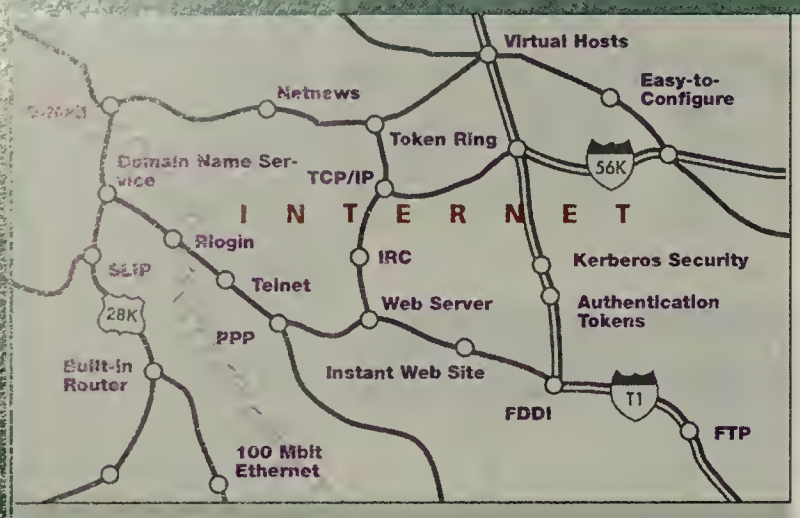

BSDI Internet Server for Enterprise Gateways, Intranets, Web Sites, and ISPs The BSDI Internet Server delivers the multi-purpose networked computing power you need to establish enterprise Internets and intranets, run high-volume Web sites, and provide full-featured Internet services. BSDI's server software integrates the robust BSD/OS kernel and its bulletproof TCP/IP with PPP and SLIP for top Internet throughput. Built-in E-mail, FTP, Netnews, and Web server software is Net-ready. In fact, BSDI-powered Pentium processor servers outperform workstation platforms that cost thousands more.

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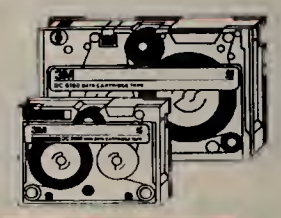

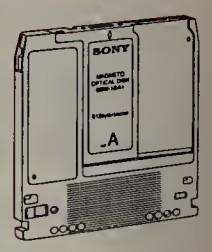

4mm Data Cartridges

	Quantity	1 - 9	10 - 49	50+
3M				
4mm HS/120 DDS 2		$25.19	23.59	22.79 ea.
4mm HS/90		9.64	9.03	8.72
4mm HS/60		7.87	7.37	7.12
Exabyte				
4mm-120M DDS 2		22.62	21.18	20.46
4mm-90M		11.55	10.82	10.45
4mm-60M		9.49	8.89	8.59
Hewlett Packard				
4mm HS/120M DDS 2		20.77	19.46	18.79
4mm HS/90M		11.18	10.47	10.11
4mm HS/60M		10.08	9.44	9.12
4mm Cleaning Cartridge - 2 pack		22.92	21.46	20.74
Maxell				
4mm HS/120 DDS 2		19.94	18.76	18.10
4mm HS/90		9.29	8.69	8.39
4mm HS/60		7.42	6.94	6.69
4mm Cleaning Cartridge		9.81	9.19	8.88
SONY				
4mm DG-120MA DDS 2		24.58	22.94	22.24
4mm DG-90MA		10.17	9.49	9.19
4mm DG-60MA		7.24	6.78	6.55
4mm Cleaning Cartridge		10.93	10.24	9.89
TDK				
4mm DG-120M DDS 2		20.44	19.14	18.49
4mm DG-90M		6.59	6.17	5.96
4mm DG-60M		6.19	5.79	5.59

8mm Data Cartridges

	Quantity	1 - 9	10 - 49	50+
3M				
8mm 112M		$ 7.87	7.37	7.12 ea.
Exabyte				
8mm-160M - For XL Drives		15.15	14.19	13.69
8mm-112M		10.49	9.83	9.49
8mm-54M		10.04	9.39	9.08
12 Pass Cleaning Cartridge		18.37	17.19	16.62
Maxell				
8mm HS-8/160M - For XL Drives		14.16	13.26	12.79
8mm HS-8/112M		7.23	6.77	6.54
SONY				
8mm QG-160MA - For XL Drives		14.68	13.74	13.28
8mm QG-112MA		8.92	8.34	8.07
8mm QG-54MA		8.69	8.14	7.86
TDK				
8mm 112M		6.59	6.17	5.96
Verbatim				
8mm 112M		7.57	7.09	6.84

CD Recordable Media

Kodak				
74 Min.		$ 7.89	7.39	7.14 ea.
SONY				
74 Min.		7.78	7.29	7.04

1/4" Data Cartridges

	Quantity	1 - 9	10 - 49	50+
3M				
DC-2120		$ 12.87	12.05	11.64 ea.
DC-2120 QIC-80 Preformatted		13.19	12.36	11.94
DC-2120XL QIC80 Preformatted		15.84	14.84	14.34
DC-6150		13.08	12.24	11.83
DC-6250		16.89	15.82	15.28
DC-6525		22.34	20.92	20.21
Magnus 1.2GB		34.69	32.49	31.39
Magnus 2.5GB		48.64	45.54	43.94
Travan TR-1 400/800MB		26.93	25.22	24.37
SONY				
DC-2120 QIC-80 Preformatted		12.54	11.74	11.34
DC-6150		12.59	11.79	11.39
DC-6250		16.26	15.23	14.69
DC-6525		21.53	20.16	19.48
Magnus 1.2GB		33.76	31.62	30.54

Rewritable Optical

	Quantity	1 - 4	5 - 19	20+
Maxoptics				
5.25" 600MB 512 B/S Poly		$ 71.94	67.37	64.94 ea.
5.25" 650MB 1024 B/S Poly		71.94	67.37	64.94
5.25" 1.2GB 512 B/S Poly		81.94	76.94	74.34
5.25" 1.3GB 1024 B/S Poly		81.94	76.94	74.34
SONY				
5.25" 600MB 512 B/S		60.94	57.29	55.34
5.25" 650MB 1024 B/S		60.94	57.29	55.34
5.25" 1.2GB 512 B/S		74.94	69.94	67.94
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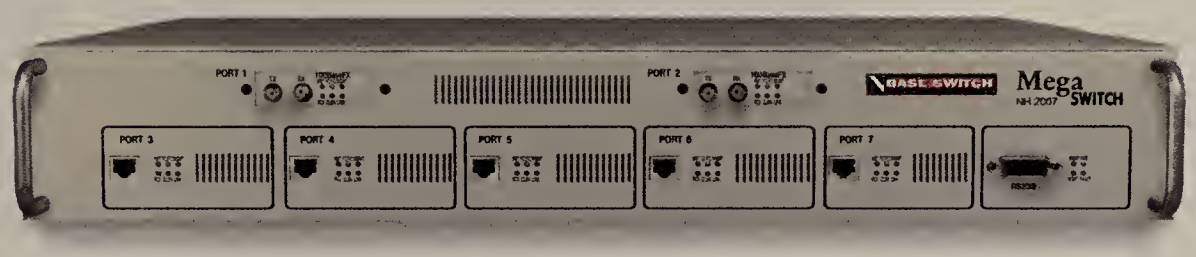

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The MegaSwitch 10/100

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- VT320 and TN3270
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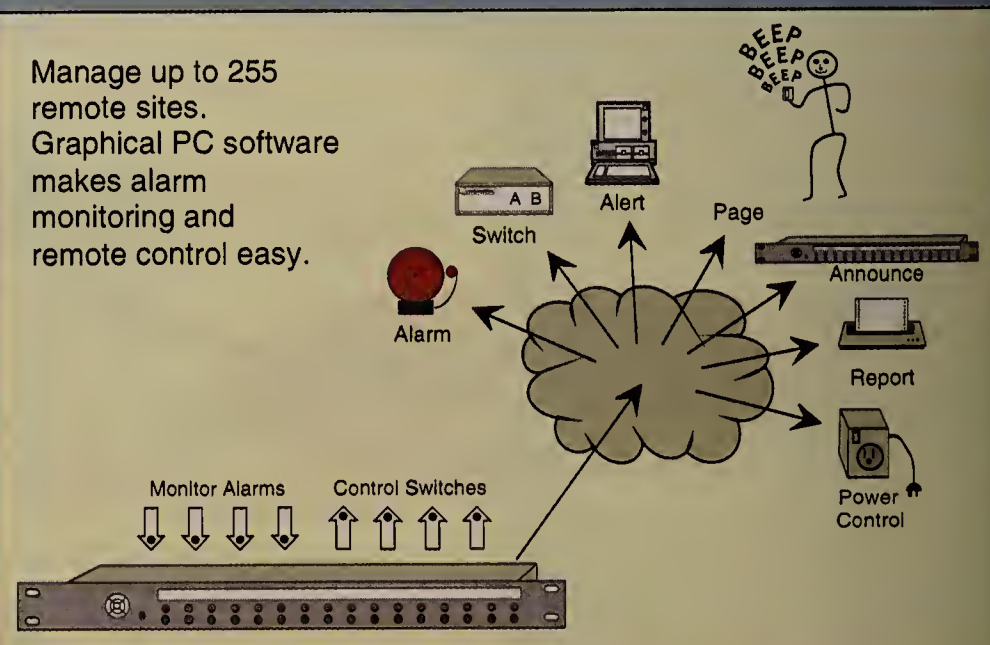

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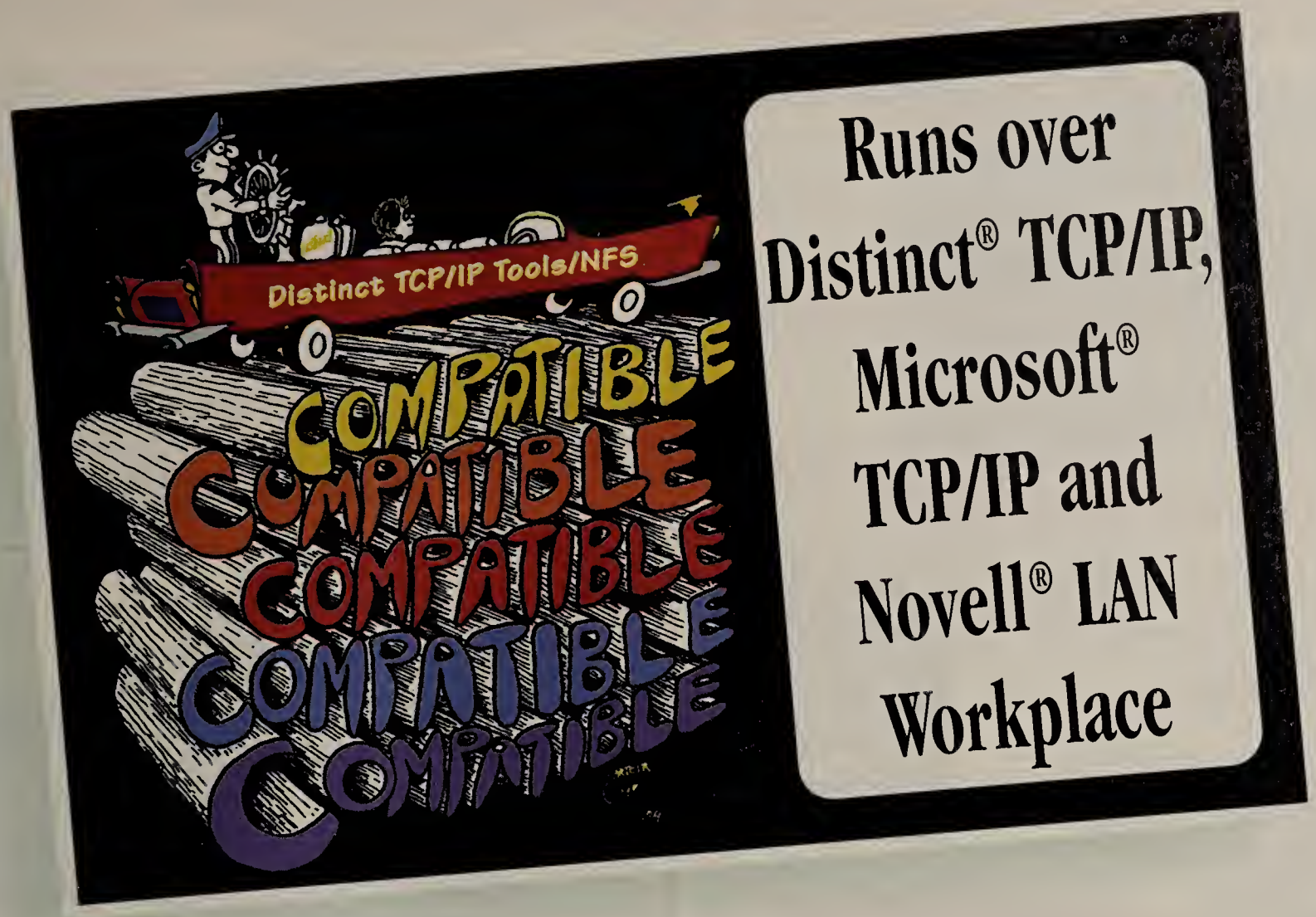

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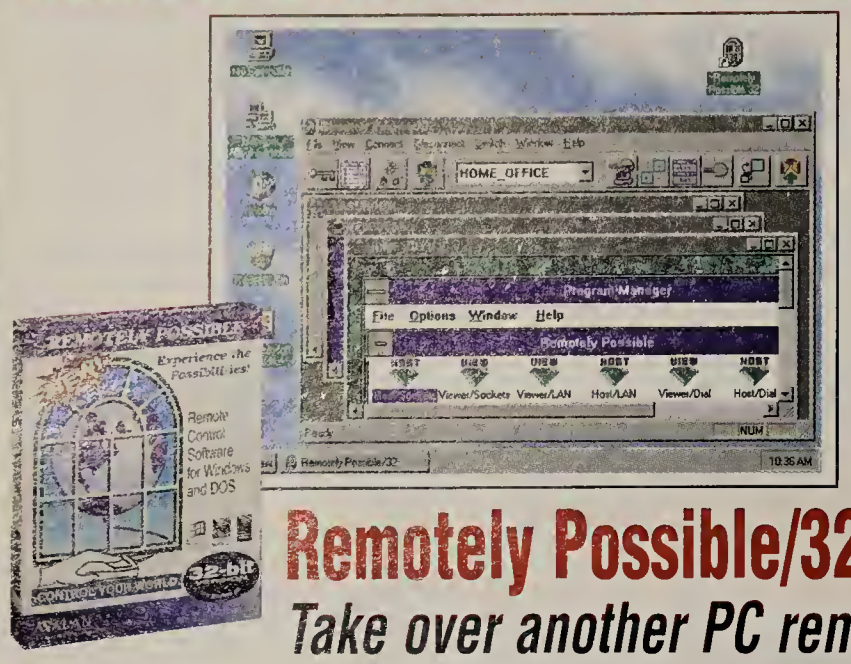

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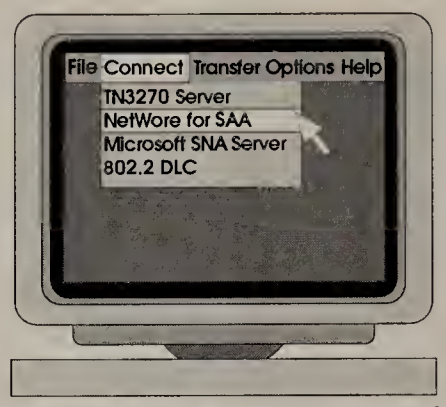

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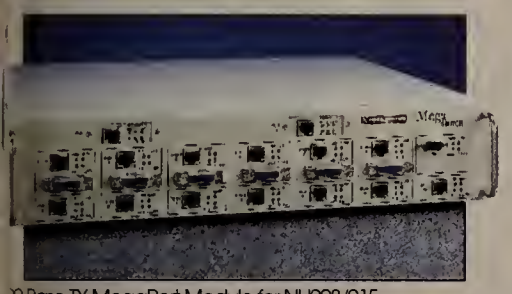

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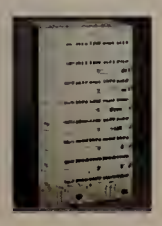

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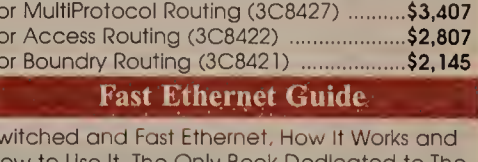

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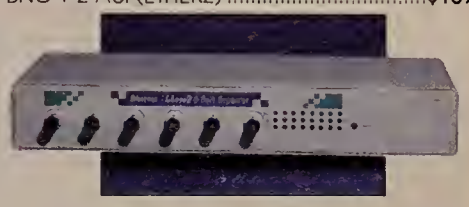

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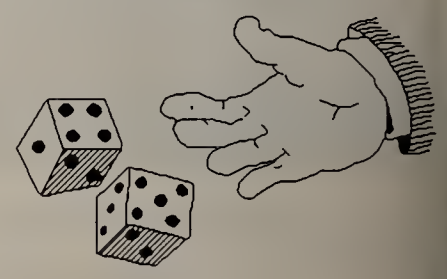

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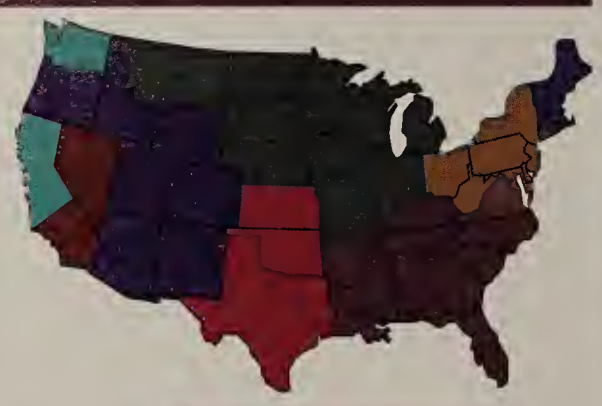

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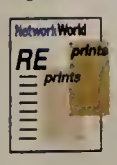

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ADVERTISER INDEX

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Frame prices

Continued from page 1

to repair and net performance.

Sprint Corp. said it will also meet the filing deadline but offered no specifics.

Tariffing frame relay is generally expected to lead to higher prices, in part because carriers can raise rates in lockstep. AT&T, historically the high-priced option, has often led the market in price hiking with other common carriers following. Its new frame relay rates raise port and permanent virtual circuit charges across the board and increase nearly all port installation charges.

Tariffing frame relay is generally expected to lead to higher prices, in part because carriers can raise rates in lockstep.

One reason that AT&T saw fit to hike prices: "In the [unregulated] environment, we had the option not to serve a customer that was not economically attractive to us," said Steve Sobolevitch, an AT&T InterSpan frame relay product manager. "Now we must serve all users indiscriminately."

Sobolevitch said the new rates will affect prospective customers only; AT&T is optimistic a petition to grandfather old rates for existing contract holders will be granted. But if the FCC denies that petition, the carrier will have to migrate customers to tariffs, perhaps by writing a separate contract tariff for each, he said.

AT&T would endeavor to write contracts so the end result "materially maintains" the terms of customers' existing deals, Sobolevitch said.

But moving to contract tariffs presents a thorny dilemma for both AT&T and its customers.

AT&T contract tariffs typically deliver discounts but are tied to basic rates, meaning each time AT&T raises prices, the contract rates go up proportionately — even on multiyear term deals.

AT&T could, however, choose to write frame relay contract tariffs with low fixed prices that do not directly reference the main schedule. While this would help users maintain current frame relay rates, AT&T would become vulnerable to resellers and other users that want the same rates: Under federal law, all contract tariffs must be publicly disclosed and made available to so-called similarly situated customers.

Arguments over who qualifies as similarly situated for super-attractive contract tariffs have led to dozens of lawsuits and complaints at the FCC against AT&T in past years.

Users still can buy untariffed frame relay services by following the letter of the law. Frame relay, the government says, becomes an enhanced service and is no longer subject to regulation if protocol conversion occurs in the network.

The legal definition of protocol conversion is when one protocol enters the network but exits as a different protocol, explained Hank Levine, a partner in the Washington, D.C. law firm of Levine, Blaszak, Block & Boothby. So long as users allow protocol conversion from, say, frame relay to SNA to happen in the carrier's network rather than on their own premises, they could ignore tariffs and keep negotiated pricing, he said.

LDDS WorldCom turns conformist

LDDS WorldCom's Feb. 5 tariff filing will slash base rates by about 30%, but will do away with the firm's long-standing nonlinear pricing component for services above 64K bit/sec.

The carrier has long priced its services by adding up pairs of port and committed information rate (CIR) charges. A port running at a given speed combined with the aggregate CIR associated with it — that is, the total speed of all the permanent virtual circuits (PVC) attached to that port — had a fixed monthly price.

The more PVCs added to a given port, the bigger the discount on the aggregate CIR, which often served as an incentive to add PVCs to connect more sites, explained Christine Heckart, senior broadband consultant at TeleChoice, Inc., a consulting firm in Verona, N.J.

According to David Natho, LDDS WorldCom data product manager, the company will price much the way other carriers do: by adding up separate flat charges for ports and PVCs. This will make comparing LDDS WorldCom prices with, AT&T's for example, "more apples-to-apples, but [it] doesn't allow the user to share in the cost savings of oversubscribed bandwidth," which has been key to the carrier's pricing structure, Heckart said.

— Joanie Wexler

Cisco

Continued from page 1

"Our product plans are clear; we aren't going to let anyone think we're going to sit still in the SNA arena," said Nick Francis, director of product marketing for Cisco's IBM programs.

Cisco's *Francis says his company will be an active player in the SNA mart.*

One of the key components of the Cisco offensive will be the new CIP software, which doubles the capacity of the current CIP. The software will allow CIP to handle 8,000 SNA physical units rather than the 4,000 it supports now, analysts said.

The CIP takes up a single slot in the Cisco 7000 or 7500 high-end router and enables users to attach SNA networks directly to the mainframe. It is a direct competitor to IBM's 3745 and 3746 front-end processors.

"If Cisco is going to target high-end SNA shops with large 3745's that support large numbers of users, its going to have to have a larger CIP," said Don Czubeck, president of Gen2 Ventures in Saratoga, Calif. "These users have to have the ability to scale up."

Czubeck said if Cisco has a major challenge ahead of it, it is to support the large number of low-speed links the 3745s support. Cisco has not demonstrated that capability to most SNA users yet, he said.

"We looked at CIP before and found in our environment, it's not that attractive because it puts all the front end-like 3745 functions back into the mainframe and eats up mainframe CPU power and memory space," said Albert Tseng, systems programmer at Southern California Gas Co. in Los Angeles. "We feel comfortable actually having that front-end controller doing all that work."

HPR is next

HPR, in fact, is the next big feature Cisco will bring to the table in a new release of the router's Internetwork Operating System software.

Sources said Cisco will add a number of extensions to HPR to make it capable of handling multiprotocol environments.

"This is Cisco putting its spin on HPR so that it adapts to its architectural flavor, which is TCP/IP," said Frank Dzubeck president of the Communications Network Architects, Inc. consultancy in Washington, D.C.

In an effort to get SNA users to IP backbones, Cisco is also releasing NCIA Version 2, its SNA to TCP/IP encapsulation software.

Developed in conjunction with Wall Data, Inc., NCIA encapsulates SNA packets in TCP/IP at the desktop, relieving an external router of that duty.

"The main difference between NCIA Version 1 and 2 is that new version works much more efficiently in that it only has to encapsulate the SNA packet itself, no LAN data or anything else," said Mitch Stein, product development manager at Wall Data. "This will let us scale it more easily and gain better performance," Stein said.

NCIA Version 2 also relieves users from having to define each NCIA client manually on the router, Stein said. Plus users gain additional flexibility because the router can now send NCIA client requests to other routers or bridges, not directly onto a LAN or host as it does today.

To help users manage the growing SNA traffic traversing the router backbone, Cisco will be rolling out a new application for its CiscoWorks Blue series that allows the CiscoWorks console to correlate SNA and TCP/IP alerts and alarms from a single screen.

"Users now cannot tell what type of traffic is traversing the router or which network [SNA or TCP/IP] is having problems," said Ellis Gregory, president of NetTech, Inc., a network management software developer working with Cisco. "Once this application is in place, users will be able to determine problems easier."

Low-end token-ring switching

Finally, to answer user demand for a low-end token-ring switch, Cisco will unveil by mid-year what sources call the Catalyst 3500 workgroup switch.

The 3500 is expected to include the token-ring switching technology — codeveloped by IBM and Kalpana, Inc. — which is in IBM's 8272.

After Cisco bought Kalpana last year, IBM and Cisco agreed to share some Kalpana switching technology. Sources indicated Cisco may just private-label the IBM 8272, but Cisco's Francis did not confirm that. ■

Digital's worst nightmare is now Cisco

While the IBM Interworking side of Cisco Systems, Inc. preps its product rollout, the Internet side is satisfying the company's appetite for software expertise.

Cisco last week announced plans to acquire longtime Digital Equipment Corp. antagonist TGV Software, Inc. in a stock swap valued at about $115 million.

TGV offers the MultiNet line of TCP/IP protocol stacks and applications. The software offerings run on Windows, Unix and Digital VMS platforms, providing connectivity across corporate intranets and the Internet.

MultiNet, however, is perhaps most famous — or infamous — for making Digital's beleaguered DECnet/Open Systems Interconnection technology irrelevant. While Digital was spinning its wheels developing OSI products in the mid-1980s, TGV built a business moving DECnet users to TCP/IP in 1988.

"We found them to be a company that was very focused on providing enterprise networking software," said Mike Volpi, Cisco's manager of business development. "They have a very good vision of the evolution of TCP/IP in the enterprise space — where things need to become more centrally administered and controlled — as opposed to from just a pure desktop perspective."

This may explain how Cisco plans to juggle TGV's technology with the TCP/IP code it obtains from Network TeleSystems, Inc. (NTS) for use in CiscoRemote client software. A Cisco spokesman said the NTS relationship will continue even though TGV also develops desktop TCP/IP products.

Volpi said Cisco believes it can use TGV technology to help it move its network expertise "further down" into the net. For example, Cisco could deliver products for reserving bandwidth from a client to a server. Today, Cisco can only do this between routers.

With TGV, Cisco may also have bought itself a general manager for its new Internet Business Unit. Craig Conway, TGV president and chief executive officer, said he would like the job, and Volpi said he was under consideration.

— Jim Duffy

Wayfarer

Continued from page 14

track. StockWatcher feeds the stock data as it changes into the client application on the PC.

The Pentium-based system at test time had 1,500 client connections and was delivering on average 40 updates per minute per user, or 60,000 updates per minute. Yet according to figures cited by Wayfarer, StockWatcher exchanged just 138,000 bytes of data per second compared to 3.5 million bytes for two other quote applications from other services, both of which supported 1,500 clients, as well. That difference in bytes per second means, among other things, StockWatcher required only a fraction of the T-1 bandwidth needed by the other applications.

All QuickServer software runs under Windows NT 3.51 or Windows 95. It is available now for Visual Basic. Visual C++ support will be added in March, and for Java and PowerBuilder by June.

The software development kit costs $499. The server deployment license is $5,000 per server, with 10 user licenses.

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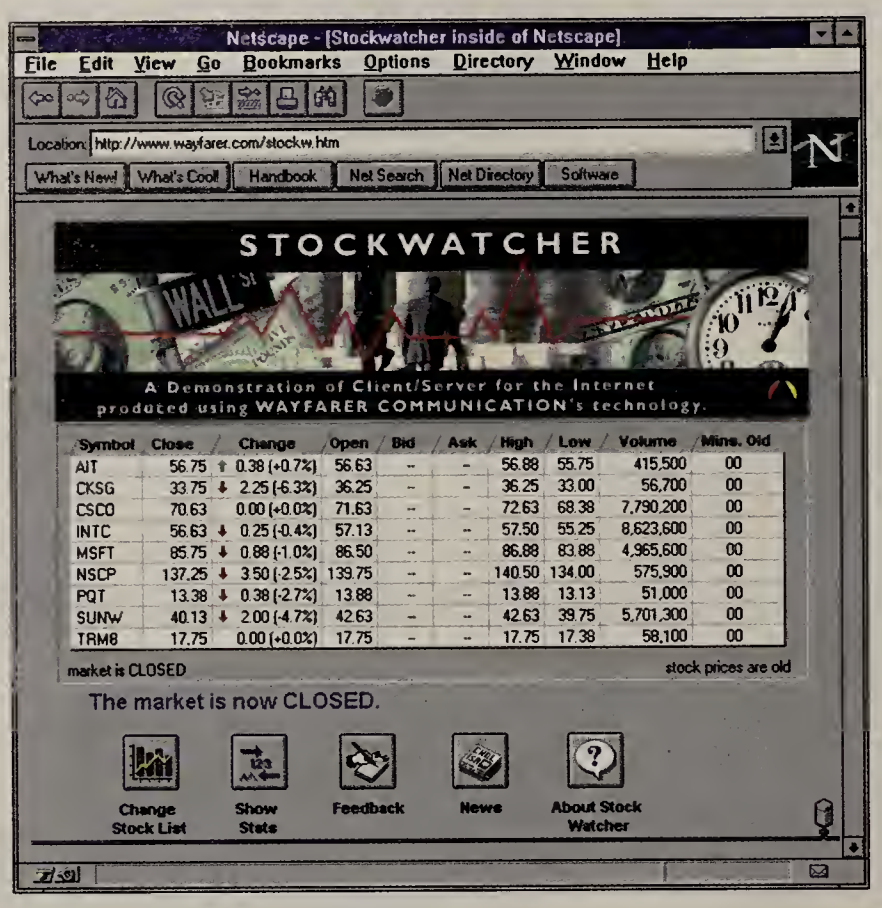

Wayfarer's *QuickServer lets StockWatcher deliver real-time stock updates via the Internet, with LAN-like performance, to browser-based applications.*

Microsoft

Continued from page 1

all the communications work associated with such connections.

If it is built and released, Microsoft MQ could dramatically extend the Microsoft operating environment, bridging the gap that exists not only between the end user and backbone-based applications and services, but also between different backbone applications themselves.

Michael Nash, Microsoft NT Server group product manager, however, cautioned customers not to conclude from the document that there was a funded development project under way with a release schedule.

"I will say that we see message queuing as very important and we're looking at it," Nash said. There are many, many projects that we look at. [MQ] may or may not happen."

But Jonathan Vaughan, vice president of applied technology at Chase Manhattan Bank in New York, said he had been briefed under nondisclosure about MQ. "It's real and it's in production [that is, in development]," he said. "A product of this nature will be a very useful complement to Microsoft's general strategy."

Competitor IBM applauded the plan.

"I'm delighted [by Microsoft's plans]," said Steve Craggs, IBM's senior manager for MQ Series. "Microsoft realizes that message queuing is an important technology. But what they're talking about is what MQ Series has today."

A decision to go ahead with MQ would signal Microsoft's determination to be a major player in the corporate network infrastructure.

"MQ provides the basic messaging mechanism essential for distributed computing," according to the document. "Distributed object service, distributed event services and transaction services will use MQ services. MQ itself will use the Windows NT directory service and security service."

The document did not elaborate on these critical points.

The paper also describes the services Microsoft MQ would deliver:

- Asynchronous messaging: Applications can send and receive messages and keep running independently of one another.
- Guaranteed delivery: Messages will be delivered after failed links or systems are restored.
- Routing and dynamic configuration: The software will route messages across multiprotocol networks, and network configurations can be changed without major changes to underlying systems.
- Connectionless messaging: Direct application-to-application links are not needed, eliminating a potential performance bottleneck in large networks.
- Security: To be based on Windows NT security at first, with Kerberos authentication to be added later.
- Prioritized messaging: MQ first transfers messages classified as most important.

According to the paper, the product would consist of runtime software on each node in the MQ network; a software development kit with a set of public APIs for building MQ applications; the MQ Enterprise Communications Manager — described as a graphical administration program for managing the entire MQ network in conjunction with Microsoft Systems Management Server.

The paper's proposed delivery targets: a beta release in '96, with general availability about the time of the Windows NT Cairo release. The strategy proposes the first release be on Windows NT Server, Windows NT Workstation and Windows 95, with ports to MVS and Unix to be added later by third parties. ■

SMARTS

Continued from page 1

Distributed Computing and Communications Lab, is developing a series of products based on its "codebook" technology. The technology, which takes fault isolation a step beyond traditional rules-based event correlation tools, will soon ship in SMARTS' first product, an automated 'Net administration tool.

Codebook event correlation uses a problem/symptom map and object repository to interpret event relationships 1,000 times faster than correlators based on if-then rules, SMARTS claimed.

SMARTS is the brainchild of Professor Yechiam Yemini, director of the Columbia lab, and his wife, Shaula Yemini, formerly manager of IBM's T.J. Watson Research Center in Yorktown Heights, N.Y.

Codebook can identify emerging problems and their root causes in real time across related network, system and application objects, even if those objects appear healthy.

To do this, codebook uses an encoding system — a map of problems and symptoms that relies on a modeling repository from SMARTS that contains data on object interrelationships. When network objects start to show the symptoms of a fault, codebook uses the map and repository to decode what and where the problem is that is causing the symptom to show up.

Shaula Yemini said this technology is much more effective than the rules-based technology found in such highly touted event correlators as Seagate Enterprise Management Software, Inc.'s NerveCenter. NerveCenter has been licensed by management-platform heavies Hewlett-Packard Co. and SunSoft, Inc.

Motorola, Inc. is one convert from NerveCenter to SMARTS technology.

The company plans to use a codebook-based application from SMARTS called the Distributed Event Correlation System to manage the huge satellite-based Iridium global wireless network it plans to make operational in 1998.

"We actually started integrating with [NerveCenter] about three years ago but had a lot of problems with bugs and one kind of deficiency or another," said Geoff Moss, development manager for integrated network management for the Iridium project.

InCharge of things

Codebook is also applicable to Internet administration, SMARTS claimed. The company's new InCharge For The Internet product uses it to automate the installation, configuration and management of Internet services, such as Web, file transfer, electronic mail and naming applications.

Today, adding a newsfeed service to thousands of Internet-connected desktops, for example, is a complex and error-prone task that requires a time-consuming 10-step process.

If an administrator slips up, he could take hours finding where the error occurred. But InCharge For The Internet makes adding the newsfeed a simple three-click process, SMARTS officials said.

The product costs less than $7,000 per server and will ship Feb. 15.

✆ SMARTS: (914) 948-6200.

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Outages

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SONET installations are posting the worst records.

For example, while Sprint Corp. boasted of completing a coast-to-coast SONET route in 1995, the number of reported blocked calls on its public network tripled (see graphic, page 6).

AT&T, whose SONET deployment is just beginning, had fewer blocked calls than the year before but suffered a big rise in outages.

Meanwhile, MCI Communications Corp. posted a dramatic turnaround. Its officials tore their hair out in 1994 over repeated network problems, but the carrier last year not only had fewer outages than in 1994, it had fewer than Sprint, which carries about half as much traffic as MCI over its net.

"Some small companies could lose their entire network and never make a reportable outage," AT&T's Locke said.

MCI officials credited a $1.7 billion investment in network equipment and not only in SONET rings. The company also deployed less glamorous equipment, such as digital cross-connects that help swing traffic off to different fiber routes within minutes of detecting a problem.

Observers said the carriers' experiences overall demonstrate that their SONET rings are not quite ready to fulfill their promise yet. But AT&T, MCI and Sprint all report that their SONET buildouts will be completed in 1997 or 1998.

The problems reported to the FCC represent only the tip of the network outage iceberg. Only major outages — those lasting at least 30 minutes and affecting at least 30,000 customers — must be reported. In addition, certain outages of any size, such as those affecting airports, also must be reported.

AT&T officials claimed this scheme unfairly portrays them in a bad light. The 30,000-customer threshold applies equally to the telecommunications giant and all other carriers, down through the independent local telephone companies serving just a few exchanges, they pointed out.

"Some small companies could lose their entire network and never make a reportable outage," said Arthur Locke, district manager for AT&T's Network Operations Center in Bedminster, N.J.

The AT&T figures also mask a system by the carrier to alleviate most of any particular outage's damage quickly, even if the outage technically lasts more than 30 minutes and requires filing a report to the government. AT&T's Fast Automatic Restoration (FASTAR) system — based on error-detection software and more than 130 paired signal transfer points — is designed to move most blocked traffic to an alternate route within five minutes.

For example, on April 24, 1995, floods in eastern Washington washed out AT&T cables in Spokane and Yakima, interrupting traffic on 100 T-3 circuits. Although the outage lasted nearly 14 hours, FASTAR restored 75 of the T-3 circuits in 5 minutes.

By contrast, many of the other carriers' outages affect all users more uniformly. The carriers frequently cite manual rerouting of the traffic around the fiber cut or other problem. To counter AT&T's FASTAR, MCI offers a 10-minute restoration system called Real Time Restoration. A Sprint spokesman did not cite any specific restoral method other than the forthcoming SONET rings.

MCI offers many of its 125 largest corporate customers, known as Select Status customers, restoral guarantees if the carrier is satisfied that the local network is reliable and has diverse routes.

The FCC figures show a substantial increase in network outages by local exchange carriers, although an official with the Network Reliability Steering Committee said that was partly due to tougher reporting requirements on emergency 911 lines.

The Sprint spokesman said floods, railroad disruptions and backhoes cutting fiber cables were prime reasons for outages in the company's network.

"Outages overall are an industry problem," he said. "Every carrier does everything it can to avoid these things." ■

Fast Ethernet

Continued from page 10

come in copper and fiber editions.

For the larger LANplex 6000 switch, 3Com announced the Tri-Media module, which features a 100Base-T port, 16 10Base-T ports and one FDDI backbone connection.

The switching module allows net managers to link Ethernet-based clients to a fast Ethernet server and an FDDI-based backbone.

On the remote access side of the house, 3Com last week rolled out a software package that lets net managers provide better security for Windows NT-based LANs accessible via 3Com's AccessBuilder remote access devices.

The software works in conjunction with Windows NT's Registry Services, enabling net managers to authorize remote LAN access using a central security database.

The software may eliminate the need for token-based security systems, which typically involve setting up a separate security server.

These external servers require end users at remote sites to insert a card in a scanner to gain access to the system, which 3Com officials said was more expensive than its new centralized approach.

The software supports a variety of desktop clients, including DOS, Windows and NetWare clients.

The security package is available now for $495 per site.

✆ 3Com: (408) 764-5000.

3Com product roundup

Product	Copper fast Ethernet module for LANplex 2500 switch	Fiber fast Ethernet module for LANplex 2500 switch	Fast Ethernet Tri-Media module for LANplex 6000 switch	AccessBuilder Security-WinNT services
Price	Starts at $1,495	Starts at $1,795	$19,000	$495 per site
Availability	March	Second quarter	March	Now

ATM

Continued from page 10

Ethernet capabilities to its LANplex and Oncore LAN switching hubs since most customers have Ethernet LANs rather than ATM-based networks.

In fact, Croce is so confused about 3Com's strategy for the Oncore product that he hopes Bay Networks, Inc., Cabletron Systems, Inc. or Cisco will buy back his Chipcom gear so he can start fresh.

3Com will try to clear up the Oncore situation somewhat by announcing a 25M bit/sec ATM module as well as copper and fiber 155M bit/sec ATM interface cards — which it gets from IBM — for the Oncore switching hub.

However, the company also will announce plans to limit its reliance on IBM for ATM technology to 25M bit/sec gear.

"It looks like 3Com is leaving the Oncore product line to die away," Croce said.

"And when I hear that 3Com is switching its ATM strategy for the Oncore, it reaffirms that feeling," he said.

He pointed out that the new ATM strategy will cause further confusion among Oncore customers about whether to buy IBM's current ATM products or to wait for 3Com's ATM gear.

The Cellplex Ethernet-to-ATM module will be available in February. The Cellplex fast Ethernet module and Oncore ATM interface modules will ship in the next six months.

Pricing information was not available.■

COMMENTS?

See "How to reach us" on page 6.

Back to Reality

Enterprise networking is not what the marketing guys want you to believe

This week, 450 networking vendors will converge on Washington, D.C., searching for a Holy Grail of marketing called the Enterprise Network Buyer. The venue is ComNet '96, a trade show expected to draw about 45,000 of these highly sought people.

I doubt that more than a handful of attendees would (without prompting) classify themselves as an Enterprise Network Buyer. A buyer, yes; a tire-kicker, maybe. They would be clear on the net-

David J. Buerger

work idea. But as for the "enterprise" part — expect about 45,000 different opinions.

The term "enterprise" conjures all sorts of images: mainframes, internetworking, wide-area networking, international networking, client/server business applications. Where it all starts and ends, and who runs the whole thing — that's cloudy.

Look no further if you count yourself among the confused. My goal here is to objectively define the term "enterprise" as it applies to networking, sans help from the marketing department.

Unfortunately, Mr. Webster provides little insight. According to this neutral source, an enterprise is an especially difficult or risky undertaking. It can also be a business organization. Of course, Webster died in 1852, so we can hardly expect him to define this modern concept.

A real place?

Undaunted by this setback, I next checked out the atlas, thinking that "enterprise" might be an actual place. I found Enterprise in Coffee County, Ala. This hamlet of 20,000 people was founded in 1884 by a bunch of cotton growers. Enterprise's economy was ravaged in 1915 when Mexican boll weevils ate all the cotton. The town's fathers decided then to diversify into peanuts, mixed farming and manufacturing.

The trail turned cold, however, when I learned that nobody in Enterprise has heard about networking.

Perhaps "enterprise" is related to a thing, I thought. A big thing.

The biggest thing I could find called "enterprise" is a boat. The USS Enterprise was the first nuclear-powered aircraft carrier, first launched in 1960 from the Newport News Shipbuilding and Drydock Co. Enterprise is powered by eight nuclear reactors. The vessel displaces 85,000 tons of water and has a flight deck of 1,101 feet by 252 feet.

U.S. Navy statistics claim the Enterprise can cruise 200,000 miles before requiring refueling. Impressive. Sounds more reliable than most networks, but that, unfortunately, does not help our definition.

There is one other enterprise well-loved by network techies: the USS Enter-

prise of "Star Trek" fame. I cannot tell you much about this giant flying saucer. I blew an hour surfing the Web, trying to locate the scoop among a plethora of servers dedicated to Trekomania. I actually spent more time lost in hyperlinks than finding information. (The most interesting tidbit I learned was Spock's other name, which is Xtmprszntwlfd. It's not in my Word for Windows dictionary.)

"Yes!" I cried. "This reminds me of real networking." (Hint: wastes a lot of time and is complicated.)

Does Uncle Sam know?

The search was still incomplete, so I decided to turn to Uncle Sam's Statistical Abstract of the United States for other clues.

I like numbers because they tell good stories. Some numbers, however, can be hard to digest. The best one I can recall is that if everyone who goes to sleep in church were laid end to end, they would be a lot more comfortable.

Anyway, figuring that enterprise networks were big as an aircraft carrier and as complicated as the Web, I decided to see how many of these critters exist.

According to the abstract, the U.S. has 6.2 million business establishments. About 87% have less than 20 employees, 11% have 20 to 99 employees, and 2% have 100 to 499 workers.

Are networks at any of these firms large enough to be called "enterprise"? Nah! Our male-dominated industry is fixated on size; we need something really big.

Only .2% have 500 to 999 employees, while just .1% have more than 1,000 employees.

Since 20% of the U.S. workforce falls into the last two categories, it's fair to say there are about 16,000 networks that statistically qualify for the enterprise label.

All of this, of course, is absurd. "Enterprise network" is just a term made up by vendors to describe organizationwide nets for big companies. Truth is, smaller networks serve their enterprises just like the big nets. The smaller guys have many of the same problems encountered by the big ones.

As the Internet gradually eliminates private boundaries, we'll end up with just one enterprise network. And that's when network managers will say, "Beam me up, Scotty!"

Buerger is an Atlanta-based writer and industry consultant. He can be reached at dbuerger@pipeline.com.

CyberSpeak

Voices from the reader network

Is Java worthy of all this hype?

"Yes, because it gives people hope that Microsoft and Intel will not be able to dominate the desktop in the future. No, because it's too slow and the corporate world will be unwilling to pay for Java apps downloaded from the Internet."
Rob Akers, software engineer, Computer Curriculum Corp., Sunnyvale, Calif.

"No. But the Internet, the World-Wide Web, Netscape and EVERYTHING Microsoft has produced have been equally undeserving of the hype they have all received."
Allen Firstenberg, chief programmer, The Addventurers, Hampton, Va.

"I don't think it is worthy. The language is still too difficult for the masses to use. A much easier language interface such as BASIC or REXX, or a scripting interface such as PERL — or even better, an interface/API that works with all the above — would have much broader appeal. I've shown Java to people I consider to be fairly computer-literate, and their response has been that it still looks like low-level language code to them. They want a much higher level language interface to allow for ease of maintenance and fast builds of scripts."
Kerry Mercer, communications technical support, Texas Instruments Software Division, Texas Instruments, Inc., Plano, Texas

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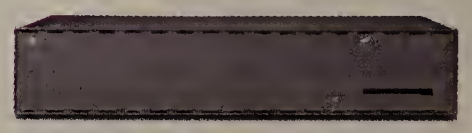

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